111505 20427 U.S. PTO

PTO/SB/05 (04-05)
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	028.0013
First Inventor	J. Kurth Reynolds
Title	METHODS AND SYSTEMS FOR DETECT...
Express Mail Label No.	EV 717961151 US

112919 U.S. PTO 11/27499 111505

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. [✓] **Fee Transmittal Form** (e.g., PTO/SB/17)
   (Submit an original and a duplicate for fee processing)
2. [ ] **Applicant claims small entity status.** See 37 CFR 1.27.
3. [✓] **Specification** [*Total Pages* 25]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
4. [✓] **Drawing(s)** (*35 U.S.C. 113*) [*Total Sheets* 5]
5. **Oath or Declaration** [*Total Sheets* 2]
   a. [✓] Newly executed (original or copy)
   b. [ ] A copy from a prior application (37 CFR 1.63(d))
   (for continuation/divisional with Box 18 completed)
   i. [ ] DELETION OF INVENTOR(S)
   Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. [ ] **Application Data Sheet.** See 37 CFR 1.76
7. [ ] **CD-ROM or CD-R** in duplicate, large table or Computer Program *(Appendix)*
   [ ] Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission**
   (if applicable, items a. – c. are required)
   a. [ ] Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or
      ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

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P.O. Box 1450
Alexandria VA 22313-1450

ACCOMPANYING APPLICATION PARTS

9. [✓] **Assignment Papers** (cover sheet & document(s))
   Name of Assignee Synaptics Incorporated
10. [ ] **37 CFR 3.73(b) Statement** *(when there is an assignee)* [ ] **Power of Attorney**
11. [ ] **English Translation Document** *(if applicable)*
12. [✓] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    [✓] Copies of citations attached
13. [ ] **Preliminary Amendment**
14. [✓] **Return Receipt Postcard** (MPEP 503)
    (Should be specifically itemized)
15. [ ] **Certified Copy of Priority Document(s)**
    (if foreign priority is claimed)
16. [ ] **Nonpublication Request** under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
17. [ ] Other:

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

[ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No.: .....

Prior application information: *Examiner* _____ *Art Unit:* _____

19. CORRESPONDENCE ADDRESS

[✓] The address associated with Customer Number: 29906 ***OR*** [ ] Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	

Signature		Date	November 15, 2005
Name (Print/Type)	Brett A. Carlson	Registration No. (Attorney/Agent)	39,928

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FEE TRANSMITTAL For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($)	2,590

Complete if Known	
Application Number	
Filing Date	November 15, 2005
First Named Inventor	J. Kurth Reynolds
Examiner Name	
Art Unit	
Attorney Docket No.	028.0013

METHOD OF PAYMENT (check all that apply)

☑ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☑ Deposit Account Deposit Account Number: 50-2091 Deposit Account Name: Ingrassia Fisher & Lorenz

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	FILING FEES Small Entity Fee ($)	SEARCH FEES Fee ($)	SEARCH FEES Small Entity Fee ($)	EXAMINATION FEES Fee ($)	EXAMINATION FEES Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	$1,000
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
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4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., ~~late filing surcharge~~): Assignment	$40

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 39,928	Telephone 480 385-5060
Name (Print/Type)	Brett A. Carlson		Date November 15, 2005

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METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES

TECHNICAL FIELD

[0001] The present invention generally relates to position or proximity sensors such as touchpads, and more particularly relates to devices, systems and methods capable of detecting a position-based attribute of a finger, stylus or other object using digital codes.

BACKGROUND

[0002] Position sensors are commonly used as input devices for computers, personal digital assistants (PDAs), media players, video game players, consumer electronics, wireless phones, payphones, point-of-sale terminals, automatic teller machines, kiosks and the like. One common type of sensor used in such applications is the touchpad sensor, which can be readily found, for example, as an input device on many notebook-type computers. A user generally operates the sensor by moving a finger, stylus or other stimulus near a sensing region of the sensor. The stimulus creates a capacitive, inductive or other electrical effect upon a carrier signal applied to the sensing region that can be detected and correlated to the position or proximity of the stimulus with respect to the sensing region. This positional information can in turn be used to move a cursor or other indicator on a display screen, scroll through text elements on the screen, or for any other user interface purpose. One example of a touchpad-type position sensor that is based on capacitive sensing technologies is described in United States Patent No. 5,880,411, which issued to Gillespie et al. on March 9, 1999.

[0003] While touchpad-type sensors have been in use for several years, engineers continue to seek design alternatives that reduce costs and/or improve sensor performance. In particular, significant attention has been paid in recent years to reducing the effects of noise generated by display screens, power sources, radio frequency interference and/or other

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sources outside of the sensor. Numerous sampling, filtering, signal processing, shielding, and other noise-reduction techniques have been implemented with varying levels of success.

[0004] Accordingly, it is desirable to provide systems and methods for quickly, effectively and efficiently detecting a position-based attribute of an object in the presence of noise. Other desirable features and characteristics will become apparent from the subsequent detailed description and the appended claims, taken in conjunction with the accompanying drawings and the foregoing technical field and background.

BRIEF SUMMARY

[0005] Methods, systems and devices are described for detecting a position-based attribute of a finger, stylus or other object with a touchpad or other sensor. According to various embodiments, the sensor includes a touch-sensitive region made up of any number of electrodes arranged in an appropriate fashion to detect user input. Modulation signals for one or more electrodes are produced as a function of any number of distinct discrete digital codes, which may be substantially orthogonal to each other. The modulation signals are applied to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the object. The resultant signal is demodulated using the plurality of distinct digital codes to discriminate electrical effects produced by the object. The position-based attribute of the object is then determined with respect to the plurality of electrodes from the electrical effects.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Various aspects of the present invention will hereinafter be described in conjunction with the following drawing figures, wherein like numerals denote like elements, and

[0007] FIGS. 1A-B are block diagrams showing exemplary sensing devices;

[0008] FIG. 2 is a flowchart showing an exemplary process for detecting a position-based attribute of an object;

[0009] FIG. 3 includes two frequency domain plots for exemplary received and demodulated signals;

[0010] FIG. 4 is a depiction of an exemplary scenario for processing electrical images of sensed objects;

[0011] FIG. 5 is a block diagram of an exemplary sensing device capable of sensing multiple position-based attributes in two dimensions;

[0012] FIG. 6 includes two block diagrams of exemplary sensing devices with a filtering capacitor: one with simultaneous sensing of multiple signal channels on a common receive electrode, and the other with unified modulation and receive electrodes;

[0013] FIG. 7 is a block diagram of an exemplary sensing device formed on a single substrate; and

[0014] FIG. 8 is a block diagram of an exemplary sensing device formed on a flexible substrate.

DETAILED DESCRIPTION

[0015] The following detailed description is merely exemplary in nature and is not intended to limit the invention or the application and uses of the invention. Furthermore, there is no intention to be bound by any expressed or implied theory presented in the preceding technical field, background, brief summary or the following detailed description.

[0016] According to various exemplary embodiments, spread spectrum techniques can be applied within a position sensor such as a touchpad to improve noise immunity and/or to provide performance enhancements. Code division multiplexing (CDM), for example, can be used to create two or more distinct modulation signals that are applied to sensing electrode(s) within the sensor, thereby increasing the effective power of the applied signals. Coded spread spectrum modulation may refer to direct sequence, frequency hopping, time hopping or various hybrids of these or other techniques. Because the modulation frequencies applied to the sensitive region cover a wider spectrum than was previously received, narrow band noise occurring at a particular frequency or moderate wide band

noise, uncorrelated with the coded modulation, has a minimal effect upon the narrower overall demodulated signal channels. The effect of noise on multiple signal channels may also be more uniform so that a minimum signal-to-noise ratio (SNR) is maintained for each useful signal channel. This concept can be exploited even further by selecting digital codes to produce frequency-domain signals that avoid known sources of noise. Spread spectrum techniques can therefore apply increased power to the sensing region while reducing the effects of noise, thereby resulting in a significantly improved SNR for the sensor in comparison to conventional time-domain multiplexing techniques of a comparable sample period. Spread spectrum techniques applied within the sensor may enable other beneficial sensor designs and features as well. These concepts are explored more fully below.

[0017] As used herein, the term "position sensor" is intended to encompass not only conventional touchpad devices, but also a broad range of equivalent devices that are capable of detecting the position or proximity of one or more fingers, pointers, styli or other objects. Such devices may include, without limitation, touch screens, touch pads, touch tablets, biometric authentication devices (e.g. fingerprint sensors), handwriting or character recognition devices, and the like. Similarly, the terms "position", "object position" and "position-based attribute" as used herein are intended to broadly encompass various types of absolute or relative positional or proximity information, and also other types of spatial-domain information such as speed, velocity, acceleration, and the like, including measurement of motion in one or more directions. Various position-based attributes may also include time history components, as in the case of gesture recognition and the like. Accordingly, many different types of "position sensors" may be capable of detecting widely varying "position-based attributes" beyond the mere presence or absence of an object in a wide array of alternate but equivalent embodiments determined by their applications.

[0018] Turning now to the drawing figures and with initial reference to FIG. 1A, an exemplary sensor 100 suitably includes a sensing region 101, a controller 102, a modulator 107, with associated drive circuitry 109, and a demodulator 117 with associated receiver circuitry 115 as appropriate. A position-based attribute of a finger, stylus or other object 121 is detected by applying various modulation signals 110A-D to electrodes 112A-D that, along with sensing electrode 114, define sensing region 101. The modulation signals 110A-D are capacitively or otherwise electrically coupled to one or more receiving electrodes 114, thereby forming any number of data transmission channels 113A-D. Electrical effects produced by object 121 upon channels 113A-D can be subsequently identified in signals 116

received by the receive electrode, and these received signals can be subsequently processed to isolate the location of object 121 with respect to electrodes 112A-D within sensing region 101. An example of a conventional technique for capacitively sensing and processing object position in a touchpad is set forth in United States Patent No. 5,880,411, referenced above, although any other sensing techniques could be used in a wide array of alternate embodiments.

[0019] Although various types of sensors 100 are capable of detecting different electrical effects produced by object 121, the exemplary embodiments of FIGS. 1A-B show configurations for monitoring changes in capacitance across sensing region 101 caused by the presence or absence of object 121. More particularly, as modulation signals 110A-D are applied to electrodes 112A-D, a "virtual capacitor" is formed between each electrode 112A-D transmitting the modulated signal and a receiving electrode 114. If an object is present within the fields created by this capacitor, the capacitance between the transmitting electrode 112 and the receiving electrode 114 is affected. Typically, the effective capacitance between electrodes 112 and 114 is reduced if a grounded (or virtually grounded) object such as a finger is present, and the effective capacitance is increased if an ungrounded conductor (e.g. a stylus) or higher dielectric object is present. In either case, the change in capacitance caused by the presence of object 121 is reflected in the output signal 116 such as voltage, current, or charge measured from receive electrode 114.

[0020] By monitoring signals 116 produced by each modulation signal 110A-D, then, the presence of object 121 with respect to each electrode 112A-D (respectively) can be determined. In the exemplary embodiment shown in FIG. 1A, four sensing channels 113A-D are shown arranged in a one-dimensional sensing array 101. In the exemplary embodiment of FIG. 1B, seven channels 113A-G are implied with several channels 113A-C arranged in a first direction between 112A-C and 114, and the remaining channels 113D-G arranged in a substantially orthogonal direction between 112D-G and 114 to allow for detection of image "silhouettes" in two dimensions, as described more fully below with reference to FIG. 4. In practice, as few as one channel (e.g. a button) or as many as dozens, hundreds or even more sensing channels could be arranged in any single or multi-dimensional pattern in a wide array of alternate embodiments. Properly arranged, the position of an object 121 with respect to sensing region 101 can be determined from the electrical effects produced by object 121 upon the transmission of modulation signals 110A-D applied to the various electrodes. These effects, in turn, are reflected in the received

signals 116 that are demodulated and subsequently processed as appropriate to arrive at output signal 120.

[0021] Further, sensor 100 may be readily configured or re-configured to create any type or number of sensing zones within region 101 by simply assigning or re-assigning digital codes used to create modulation signals 110. As shown in FIGS. 1A-B, each receiving electrode 114 may receive signals coupled by any number of signal channels 113, thereby resulting in multiple result signals 116 being provided on a single path. Because signals 116 are provided on a common path, sensing channels 113 of any number of electrodes may be created on a permanent or temporary basis by simply applying a common modulation signal 110 (e.g. a modulation signal 110 formed from a common digital code) to each of the transmit electrodes 112 making up the sensing zone. Sensing zones within region 101 may overlap and/or vary with time, and are readily re-configurable through simple application of different digital codes to one or more electrodes 112. More than one electrode may be part of a channel, and more than one channel modulation may be applied to an electrode.

[0022] In a traditional sensor, modulation signals 110A-D are typically simple sinusoidal or other periodic alternating current (AC) signals applied sequentially to the various channels using any form of time domain multiplexing (TDM). By applying spread spectrum concepts commonly associated with radio communications to sensor 100, however, numerous benefits can be realized. In particular, digital coding techniques similar to those used in code division multiple access (CDMA) radio communications can be employed to create distinct modulation signals 110A-D that can be simultaneously applied to the various sensing zones of region 101, thereby potentially reducing the switching complexity of sensor 100.

[0023] Spread spectrum techniques applied within sensor 100 may provide additional benefits, such as improved resistance to noise. Because each signal channel 113 results from the application of an appropriate digital code, for example, principles of code gain can be readily exploited to improve the performance of sensor 100. The gain of each modulation signal 110 applied to one or more transmit electrodes 112 increases with the length of the code. Through the use of conventional code generation techniques, combinatorial variations of the digital codes with well-known spectral and correlation properties are relatively easy to generate. Further, these combinatorial variations provide a relatively large pool of potential distinct digital codes from which to create modulation signals 110 with desirable time or

frequency domain characteristics, as described below. Additional detail about particular code generation and signal processing techniques are described more fully below.

[0024] Again with reference to FIGS. 1A-B, sensing region 101 is any capacitive, resistive, inductive or other type of sensor that is capable of detecting the position, proximity and/or other position-based attribute of a finger, stylus or other object 121. Exemplary sensing regions 101 include the various sensors produced by Synaptics Inc. of Santa Clara, California, which appropriately detect a one dimensional, two dimensional or multi-dimensional position of an object 121 using capacitive or inductive coupling, although many other sensing regions 101 could be used in a wide array of alternate embodiments. Other types of sensing regions 101 capable of detecting position or proximity include sensors based upon acoustic, optical, or electromagnetic properties (e.g. radio frequency, infrared, ultraviolet or the like), and/or any other effects.

[0025] Controller 102 is any processor, microcontroller, neural network, analog computer, programmed circuitry, or other module capable of processing input data 118 to extract output indicia 120 and/or the like. The particular control circuitry 102 used varies widely from embodiment to embodiment, but in exemplary embodiments controller 102 is a model T1004, T1005, T10XX or other microcontroller produced by Synaptics Inc. of Santa Clara, California. In many embodiments, controller 102 includes and/or communicates with a digital memory 103 that suitably stores digital instructions in any software or firmware form that are executable by controller 102 to implement the various sensing, control and other functions described herein. Alternatively, the functions of memory 103 may be incorporated into controller 102 such that a physically distinct memory device 103 may not be present in all embodiments. The physical controller may also incorporate more elements including the drive circuitry 109 and receive circuitry 115, as well as, others described.

[0026] Code generation module 104 is any discrete or integrated circuit, device, module, programming logic and/or the like capable of producing digital codes 106 that can be used in generating modulation signals 110A-D. The number, size and types of digital codes produced vary significantly, but in various embodiments the codes are substantially orthogonal to each other, and are of sufficient length to provide for enough distinct digital codes to be associated with each sensing zone of region 101. The discrete codes may be binary, ternary, or generically multi-level, and may indicate both driven and un-driven states (tri-state).Various circuits, modules and techniques for generating digital codes suitable for

use with CDM include shift register sequences such as Walsh-Hadamard codes, m-sequences, Gold codes, Kasami codes, Barker codes, delay line multiple tap sequences, and/or the like. Alternatively, digital codes may be pre-determined and stored in a lookup table or other data structure within controller 102 and/or memory 103, and/or may be generated by controller 102 using any suitable algorithm. In such embodiments, code generation module 104 may not be present as a separate physical element from controller 102, but rather should be considered to be a logical module representing the code generation and/or retrieval function carried out by controller 102 or other digital processing devices as appropriate.

[0027] The term "substantially orthogonal" in the context of the distinct digital codes is intended to convey that the distinct codes need not be perfectly orthogonal from each other in the mathematical sense, so long as the distinct codes are able to produce meaningful independent results. Strict orthogonality may thus be traded off for various other properties such as correlation, spectra, or compressibility. Similarly, the term "sensing zone" is intended to convey that a single code could be applied to multiple electrodes 112 to create a single zone of sensitivity that encompasses a larger portion of sensing region 101 than any of the individual electrodes 112. Also, more than one code could be applied to an electrode creating overlapping or spatially filtered "sensing zones". For example phase delayed or "shifted" versions of the same code sequence can be distinct and substantially orthogonal such that they are readily distinguishable. In various cases, interpolation between phase shifts may even be possible.

[0028] Modulator 107 is any circuit, logic or other module capable of producing modulation signals 110A-D using the distinct digital codes produced by module 104. Typically, modulator 107 modulates a carrier signal 111 with the digital codes 106 using any type of amplitude modulation (AM), frequency modulation (FM), phase modulation (PM) or another suitable technique to create modulation signals 110A-D. Accordingly, modulator 107 may be implemented using any conventional digital and/or analog circuitry, or may be partially or entirely implemented with software logic executing within controller 102 or the like. Carrier signal 111 may be produced by any oscillator or other signal generator 105 as appropriate. In one embodiment suitable for use in a capacitively-sensing touchpad, signal 111 can be produced at frequencies that range from about 10 kHz – 100 MHz, although these signals may be produced at any frequency or range in a wide array of equivalent embodiments. Additional detail about an exemplary modulation function is

described below with respect to FIG. 3. In still other embodiments, carrier signal 111 is eliminated and spectral components of the applied modulation signals 110A-D are determined from the clock rate, repeat lengths and/or other aspects of the digital codes. The carrier signal 111 may therefore be eliminated and/or conceptualized as a direct current (DC) signal in various alternate embodiments.

[0029] Modulation signals 110A-D are applied to electrodes 112A-D of sensing region 101 in any manner. In various embodiments, modulator 107 suitably applies the signals to the appropriate electrodes 112A-D via any drive circuitry 109, which includes any sort of scaling amplifier, multiplexer, switch to any current or voltage source, charge transfer device, controlled impedance, and/or the like. Although FIG. 1 shows a single driver circuit 109 interconnecting modulator 107 and sensing region 101 in a serial fashion, in practice drive circuitry 109 will typically include multiple amplifiers, multiple drivers and/or other signal paths providing parallel connections between modulator 107 and the various electrodes 112 within sensing region 101 to permit multiple sensing channels 113 to be driven by modulated electrodes 112 simultaneously with the same or different signals.

[0030] As noted above, modulation signals 110A-D are provided to electrodes 112A-D in sensing region 101, and resultant signals 116 from receiving electrode 114 are provided to a suitable demodulator 117. A scaling amplifier, multiplexer, filter, discriminator, comparator, and/or other receiving circuitry 115 may be provided as well to shape received signals 116. Demodulator 117 is any circuit or other module capable of demodulating the output 116 of sensing region 101 to identify any electrical effects produced by object 121. Demodulator 117 may also include and/or communicate with a demodulation filter, such as any suitable digital or analog low-pass or band-pass filter, as well as any conventional analog-to-digital converter (ADC). In various embodiments, demodulator 117 receives carrier signal 111 and/or the phase shifted versions of the distinct digital codes 106 to allow demodulation of both signals. Alternatively, demodulator 117 provides analog demodulation of carrier signal 111 and provides the resultant signals to controller 102 and/or receiving circuitry 115 for subsequent processing. Similarly, the demodulation function represented by module 117 in FIG. 1 may be logically provided in hardware, software, firmware and/or the like within controller 102 and/or another component, thereby removing the need for a separately-identifiable demodulation circuit 117.

[0031] During the operation of sensor 100, any number of distinct digital codes are produced by code generation module 104 and modulated with a carrier frequency to create a set of modulation signals 112A-D applied to any number of electrodes 112A-D within sensing region 101. The position of object 121 with respect to sensing region 101 electrically affects one or more output signals 116 provided from sensing region 101. By demodulating the resultant signals 116, the electrical effects can be identified and subsequently processed by controller 102 or the like to determine a position-based attribute relating to object 121. By modulating the electrodes with an appropriate digital code, the narrower sensing frequency for the sensor is effectively spread across multiple frequencies, thereby improving noise rejection. Moreover, the use of code division multiplexing allows each of the modulation signals 110A-D to be applied simultaneously, thereby reducing or eliminating the need for separate time domain switching and control in many embodiments. The electrical effects identified from sensing region 101 using spread spectrum techniques may be further processed by controller 102 and/or another processing device as appropriate.

[0032] With reference now to FIG. 2, an exemplary process 200 for detecting a position-based attribute of an object with respect to a sensing region 101 suitably includes the broad steps of producing a set of distinct digital codes for modulation signals 110A-D (step 201), demodulating each of the response signals 116 that result from the application of modulation signals 110A-D (steps 204, 206), and determining one or more position-based attributes of object 121 from the electrical effects identified within the response signals 116 (step 208). In various further embodiments, the particular digital codes generated in step 202 may be modified (step 210) to reduce the effects of noise, reducing interference on other devices caused by this device, or for any other purpose. Additional processing may also be performed (step 212), such as single or multi-object processing, rejection of undesired image data, and/or the like.

[0033] Although flowchart shown in FIG. 2 is intended to show the various logical steps included in an exemplary process 200 rather than a literal software implementation, some or all of the steps in process 200 may be stored in memory 103 and executed by controller 102 alone and/or in conjunction with other components of sensor 100 (e.g. code generation module 104, modulator 107, demodulator 117 and/or the like). The various steps may be alternately stored within any digital storage medium, including any digital memory, transportable media (e.g. compact disk, floppy disk, portable memory and/or the like), magnetic or optical media, and/or the like. The various steps of process 200 may be applied

in any temporal order, or may be otherwise altered in any manner across a wide array of alternate embodiments. Further, the various steps shown in FIG. 2 could be combined or otherwise differently organized in any manner.

[0034] As noted above, the distinct digital codes 106 used to create modulation signals 110A-D may be produced in any manner (step 201), such as by any type of hardware or software logic represented by code generation module 104 in FIG. 1. Any number of feedback shift registers, for example, can be configured in a maximum length sequence (MLS) or the like to generate a pseudo-random digital code of any desired length that could be readily applied in a variety of phases and/or sums as distinct code sequences to the various modulation signals 110A-D. The resulting sequence of binary codes 106 emanating from parallel shift registers is generally spectrally flat, with the exception of a minimal DC term. In an alternate embodiment, a MLS or other routine for generating digital codes 106 may be simulated in software executing within controller 102, or elsewhere as appropriate. In still other embodiments, codes 106 are generated prior to use and stored in a lookup table or other data structure in memory 103, or the like. In various alternate but equivalent embodiments, controller 102 may directly generate or retrieve codes 106 and/or may produce them by directing the operation of a separate code generation module 104 or the like. As noted above, the particular codes may be generated in any manner. A digital bit sequence may be simply shifted in phase, for example, to create multiple distinct codes. Alternatively, distinct codes can be computed from other codes using a variety of methods including summation, exclusive-or, and multiplication, and/or other techniques of generating high dimensionality random and pseudo-random sequences. Code generation techniques based upon exclusive-or or multiplication operations may provide an additional benefit of generating linear combinations that may be useful in some embodiments.

[0035] The various codes 106 are then used to modulate or otherwise create the particular modulation signals 110A-D that are applied to the various sensing electrodes 112A-D in sensing region 101 (step 202). As described above, the applied signals are electrically affected by the presence of object 121, with the resultant electrical effects being determinable from received signal 116 (step 203).

[0036] Demodulating received signal channels 113 (in step 204) suitably involves extracting information about the position of object 121 from the modulated signals. Such extraction typically involves reversing the modulation process described above.

Accordingly, demodulator 117 typically receives carrier signal 111 (or another signal that is synchronous with signal 111) for performing analog demodulation and/or signal discrimination (e.g. distinguishing between noise and desired signal) in addition to the particular digital code 106 that previously modulated the carrier signal used to create the particular resultant signal 116. Because the sensor both transmits and receives, it is rarely necessary to recover the carrier or code sequence.

[0037] Demodulation may be carried out for any number of received signal channels 113, as appropriate (step 206). In the exemplary sensor 100 shown in FIG. 1A, signal 116 resulting from the transmission of each signal channel from the modulated electrodes 112A-D are received on a common path emanating from receiving electrode 114. Even if the various sensing channels 113A-D are all active at the same time (e.g. modulation signals 110A-D are simultaneously provided to each modulated electrode 112A-D), however, the resulting signals 116 produced by each channel 113A-D can be demodulated using conventional CDM demodulation techniques. Particular components (or channels) of resultant signal 116 produced in response to any modulation signal 110A-D can therefore be readily extracted. This concept can be exploited in myriad ways, as described below, to create a number of additional features and performance enhancements within sensor 100. A common modulation signal 110A-D, for example, could be applied to multiple electrodes 112A-D to increase the size of any particular sensing zone within region 101. These zones can be readily adjusted during operation to create various operating modes or the like. To make the entire sensing region 101 act as a single button, for example, each electrode 112A-D could be provided with the same modulation signal 110 without otherwise adjusting the performance of the sensor. Because all of the signals resulting from receive electrode 116 are provided on a common path in FIG. 1, simply demodulating the entire received signal using the common modulation code will identify the presence of object 121 anywhere within sensing region 101 in this case. Similar concepts can be applied to create any number of independent or overlapping sensing zones across sensing region 101 through simple manipulation of digital code sequences 106. Furthermore, spatial frequency filtering can be done simply through proper modulation and demodulation, for example to accomplish palm rejection or to reject other inappropriate inputs.

[0038] The demodulated signals 118 are appropriately received at controller 102 so that the position-based attribute of object 121 can be determined (step 208). These signals may be filtered digitally or as analog, using linear and non-linear filters. Various techniques for

identifying the position of object 121 with respect to the various electrodes 112A-D include detection of peak electrical effect, computation of a centroid based upon the electrical effects, comparison of differences in electrical effects observed between electrodes 112A-D, comparison of changes in electrical effects over time, interpolation between signal channels from the electrodes, and/or according to many other techniques. In the case of peak detection, the position of object 121 is associated with one or more electrodes 112A-D by identifying which modulation signal 110A-D produced the greatest relative change of capacitive effect in resultant signal 116. Sensing channels 113A-D experiencing such peak (maximum, minimum, or otherwise distinct) electrical effects could also be identified by comparing currently-observed, scaled electrical effects to baseline values (e.g. average values for the particular channel that are empirically determined, averaged over time, stored from a previous observation, and/or the like). Still other embodiments could identify the channel 113A-D that produced peak electrical effects by comparing current electrical effects for each channel 113A-D with current values observed in neighboring sensing channels. Alternatively, a weighted average of the electrical effects observed from some or all of the modulated electrodes 112A-D can be computed, with this weighted average, or centroid, correlating to the position of object 121. Many techniques for correlating electrical effects observed across sensing region 101 to a position of object 121 are known or may be subsequently developed, and any of these techniques may be used in various embodiments, according to the application.

[0039] By varying the digital codes 106 used to create modulation signals 110A-D over time, various additional features can be implemented. To implement a simple dual-differential digital-to-analog conversion for received signal channels 113, for example, the digital code 106 applied to one or more electrodes 112 is logically inverted (e.g. 1's complement) on a periodic, aperiodic, or other time basis to obtain complementary sensed signals 116. The complementary codes 106 can be used to drive two separate ADC inputs (e.g. ADCs present in driver 115 and/or demodulator 117) in opposite directions, thereby canceling out many types of variability or residual distortion in signal 116. Steps 210 and 212 describe optional noise reconfiguration and image processing features, respectively, that may be enabled in various embodiments as additional benefits available from the use of spread spectrum techniques. These features are described in increasing detail below (in conjunction with FIGS. 3 and 4, respectively), and may not be present within all embodiments. Because the digital codes 106 are inherently simple to modify, store and

subsequently process, any number of signal enhancement, noise reduction and/or other performance improvements to sensor 100 are enabled. Further, a relatively large number of digital codes are available due to the combinatorial power of digital sequences. Coding gain and orthogonality conventionally rely upon linearity and superposition of the particular codes used. Although non-linearity and dispersion limit the theoretical effectiveness of digital codes, these limitations can be more than offset by the increases in relative signal power (and thus SNR) that can result from simultaneously modulating more than one electrode 112. Further, since it is possible that self-induced inter-channel noise dominates over other noise sources in many embodiments, a relatively stable dynamic range can be provided.

[0040] Referring now to FIGS. 3A-B, spread spectrum techniques allow for improved noise avoidance as compared to conventional single-frequency sampling techniques. As noted above, a sensing zone may correspond to a single electrode 112, or a common modulation signal 110 may be provided to multiple electrodes 112 to create a larger sensing zone that effectively behaves as a single "electrode" for purposes of subsequent demodulation and computation. The modulated waveform 110, being the function of a distinct digital code 106, uniquely identifies the sensing zone to which it is applied, thereby allowing ready application of CDM and other conventional spread-spectrum techniques. FIG. 3 shows an exemplary spectral plot 300 that emphasizes the frequency domain differences between the spectrum 302 of carrier signal 111 and the spectrum 304 of modulated signal 110. In contrast to a single-frequency carrier signal 302, the multi-frequency spectrum 304 of modulated signal received on 114 is much wider. Because the spectrum 304 of the modulated signal distributes available power across a much wider sensitivity band, the effects of narrowband noise signals 306 at or near any particular frequency of interest are significantly reduced. That is, if a spurious noise signal 306 happened to occur near a single-frequency (or narrowband) carrier signal 302, any electrical effects present within the sensing channel 113 could be overwhelmed by the noise. Moreover, adverse effects of wider-band noise 308 or interference from other modulated electrode channels 310 can be mitigated through spread-spectrum techniques, as shown in spectral plot 350 of received signal 116. Plot 350 shows that the demodulated signal 352 (corresponding to coupling of a channel 113 and/or the presence of object 121 near the demodulated sensing region) is contained within a relatively narrow frequency band, whereas signals 354 received from other channels are spread across a wider band. Both

wideband noise 308 and narrow band noise 306 are similarly spread across wider frequency bands 356 and 358 in the demodulated signal. By increasing the bandwidth of the applied modulated signal 110, then, the signal-to-noise ratio in the demodulated signal 116 is improved dramatically. The demodulation in turn spreads the noise outside of the signal band, which then becomes quite narrow, thereby allowing the desired signal portion 352 to be readily extracted by a narrow band filter or the like.

[0041] This concept can be further exploited by selecting digital codes 106 that avoid known sources of noise. That is, digital codes 106 of any bit length may be applied to carrier signal 111 to create spectral "gaps" at frequencies known to be susceptible to spurious noise. By applying conventional Fourier analysis (e.g. using a simple fast Fourier transform (FFT) or the like), digital codes can be selected to create modulation signals 110 having many desired spectral characteristics. Codes applied to any modulated electrode 112 can be modified during operation (e.g. step 210 in FIG. 2) and/or may be pre-selected to avoid expected or observed noise in resultant signals 116. Alternatively, the particular codes 106 applied to one or more electrodes 112 may be randomly, pseudo-randomly, deterministically or otherwise modified during sensor operation, thereby statistically filtering any noise present within resultant signals 116 or demodulated signals 118 over time. Similarly, particular spatial frequencies or spatial positions can be emphasized (e.g. with code gain) or filtered out by the codes applied to different modulation electrodes. Code shifting during operation may provide other benefits (e.g. discrimination of or resilience to moisture) in addition to reducing the effects of noise or spurious effects of non-input objects (palm etc). In various equivalent embodiments, the frequency, phase, amplitude and/or waveform of carrier signal 111 may be adjusted in place of or in addition to modifying digital codes 106.

[0042] With reference now to FIG. 4, spread spectrum techniques that simultaneously apply multiple coded modulation signals 110A-D to various electrodes 112A-D are able to identify multiple presences 408, 410, 412 of objects 121 located within sensing region 101. Multiple objects may correspond to the presence of multiple fingers on a touchpad, for example, a palm resting on sensor 100 during use, simultaneous presence of a finger and a stylus, and/or any other combination of inputs. Electrical effects resulting from the various presences 408, 410 can be conceptually projected along one or more axes 404, 406 to identify the relative positions of the objects along that axis, as shown in FIG. 4. That is, peak value(s) of electrical effects can be correlated to relative positions of objects 121 with

respect to sensing region 101. In the example of FIG. 4, a finger 408 may be identified by increases in electrical effects projected along an "X" axis 404 and a "Y" axis 406. By correlating the relative X and Y positions of peak electrical effects, the location of presence 408 can be correlated in two dimensions (or any other number of dimensions). Similarly, the example of FIG. 4A shows a larger area indicating a second presence 410 that results projections of electrical effects in axes 404 and 406. These multiple projections of electrical effect can be additionally correlated to identify images (e.g. "outlines") of objects 121 present within region 101. Taking this concept further, one or more images 408, 410 may be subsequently processed as appropriate. Presence of multiple fingers within region 101 may be used to perform scrolling, mode selection or other tasks, for example. Similarly, if an image can be identified as resulting from a user's palm (or another undesired portion of the user's body), that image 410 can be subsequently rejected in future processing, such as reporting of positional information or other output signals.

[0043] In the exemplary embodiment shown in FIG. 4, the two axes 404, 406 generally correspond to portions of modulated electrodes 112 or their associated channels shown arranged in two approximately orthogonal directions as in FIG 1B. Alternate embodiments, however, may include any number of electrodes 112 arranged in any overlapping, non-overlapping, matrix or other arrangement. An example of a sensor 500 with overlapping electrodes 112A-G arranged in two dimensions is shown in FIG. 5. In such embodiments, electrical effects on received channels can effectively be independently measured at each crossing of the electrodes in two directions (e.g. X and Y directions corresponding to axes of 404, 406 in contour plot 400), with the results correlated in controller 102 to provide a two-dimensional representation or image of object 121 rather than two one-dimensional "silhouettes" like 404 and 406. In such cases, electrodes arranged in the first direction (e.g. electrodes 112A-C) may be modulated at separate times from electrodes arranged in the second direction (e.g. electrodes 112D-G), with one or more independent received signals 116 at any one time from either set of electrodes (e.g. electrodes 112D&F) being provided to demodulator 117 via a multiplexer 502. FIG. 5 shows the various electrodes 112A-G coupled to both modulator 107 and demodulator 117 via a multiplexer 502. The multiplexer may also connect one or more of the electrodes to receiving circuitry 115 before demodulation. In practice, each electrode may be connected in any manner to allow signals to be applied on one subset of electrodes 112 and received on another subset.

[0044] In various embodiments, two or more electrodes which serve to receive channels (e.g. analogous to channel 113 described above) may be provided with independent resultant signals 116. Further, inactive or unused electrodes (e.g. 112E&G may be coupled to an electrical reference (e.g. ground) or driven with a modulated signal to improve spatial resolution on the active receive channels. This reference is commonly referenced as a shield or guard signal, which may be applied via multiplexing logic 502 or the like.

[0045] Digital coding and other spread-spectrum techniques may be equivalently applied in sensors that operate in any number of different manners. FIG. 6A, for example, shows an exemplary sensor 600 that includes any number of modulated electrodes 112A-B arranged in any single or multi-dimensional fashion that are coupled to a capacitive filter (e.g. an integrating capacitor 610) which linearly transforms the charge transferred by the modulated electrodes. A microcontroller 102/104 or the like suitably generates distinct digital codes 106 that modulate 112A-B coupled to 114 electrode as described above. In this case, however, the digital codes 106 are not necessarily intended to encode the voltage provided to each electrode 112A-B, but rather to control the timing of charge that is transferred to 114. By controlling the timing of each electrode's charging and discharging and then observing the amount of charge collected at integrating capacitor 610 from 114, the amount of charge provided by each electrode 112A-B can be determined from the demodulated signal 118. The charging of each electrode 112A-B can be controlled by selecting digital codes 106 such that voltage is applied to each electrode only when charge should be transferred to the receiving electrode 114, and otherwise allowing it to float. By selectively providing charge from individual and/or groups of electrodes 112A-B to capacitor 610, the amount of coupling from each electrode 112A-B (which is affected by the proximity of an object 121) can be determined.

[0046] FIG. 6B presents an alternate embodiment of an exemplary sensor that has unified sensing and driving on each electrode 112 that is filtered or demodulated by one or more capacitors 610. The codes 106 modulate drive circuitry 109, which may be implemented as a current source connected to the electrodes 112. The response of the electrode to the drive circuitry is affected by the coupling of an object 121 near the electrode, and the resultant signals (e.g. the voltage resulting from the coupling) are filtered and/or demodulated by the circuit 604 and capacitor 610. The filtered signals may be further demodulated to determine position attributes of the object. Further, more than one electrode could be simultaneously driven with substantially orthogonal codes and after demodulation a stable coupling of one

electrode 112A to another electrode 112B would substantially cancel out. These and many other position sensing methods benefit from digital coding and spread spectrum techniques.

[0047] With reference now to FIG. 7, various sensors 700 formed in accordance with the coding techniques described herein may be formed on a single circuit board or other substrate 702. In such embodiments, electrodes 112A-G forming sensing region 101 may be disposed on one side of the substrate, with the processing components (e.g. controller 102 and the like) formed on the opposite side. Because various sensors (e.g. sensors 100 and 500 shown in FIGS. 1 and 5) do not require physical movement of sensing and receiving electrodes 112, 114 with respect to each other, electrodes 112, 114 in such sensors may be rigidly fixed on substrate 702 in any manner. Substrate 702 can be made of a flexible material to allow for folding or bending. Further, a protective surface 704 may be deposited or otherwise placed over the electrodes to provide consistent dielectric isolation and to protect against moisture, dust and other environmental effects. Surface 704 may also provide tactile feedback to the user as appropriate. FIG. 8 shows an exemplary sensor 800 is formed on a flexible substrate 802 as appropriate. FIG. 8 also shows that the various processing components may be found on the same side of substrate 802 as the modulated and sensing electrodes , and that the substrate 802 may also provide tactile feedback for region 101. It should be appreciated that the various concepts, structures, components and techniques described herein may be inter-combined and/or modified as appropriate to create a wide variety of alternate embodiments.

[0048] Accordingly, there are provided numerous systems, devices and processes for detecting a position-based attribute of a finger, stylus or other object in a position sensing device such as a touchpad. While at least one exemplary embodiment has been presented in the foregoing detailed description, it should be appreciated that a vast number of variations exist. The various steps of the techniques described herein, for example, may be practiced in any temporal order, and are not limited to the order presented and/or claimed herein. It should also be appreciated that the exemplary embodiments described herein are only examples, and are not intended to limit the scope, applicability, or configuration of the invention in any way. Various changes can therefore be made in the function and arrangement of elements without departing from the scope of the invention as set forth in the appended claims and the legal equivalents thereof.

CLAIMS

What is claimed is:

1. A method of detecting a position-based attribute of an object with respect to a touch-sensitive region comprising a plurality of electrodes, the method comprising the steps of:

producing a plurality of distinct digital codes used to create a plurality of modulation signals applied to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the object;

demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the object; and

determining the position-based attribute of the object with respect to the plurality of electrodes from the electrical effects.

2. The method of claim 1 wherein the determining step comprises identifying at least one peak value of the electrical effects.

3. The method of claim 1 wherein the determining step comprises computing a centroid of the electrical effects.

4. The method of claim 1 wherein the determining step comprises determining a difference between the electrical effects received from at least two electrodes.

5. The method of claim 1 wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects.

6. The method of claim 1 wherein the position-based attribute corresponds to a position of the object with respect to the plurality of electrodes.

7. The method of claim 1 wherein the position-based attribute describes a motion of the object with respect to the plurality of electrodes.

8. The method of claim 1 wherein the position-based attribute describes a change in position from a previous value.

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9. The method of claim 1 wherein the position-based attribute describes a velocity of the object.

10. The method of claim 1 wherein the position-based attribute describes an acceleration of the object.

11. The method of claim 1 wherein each of the plurality of distinct digital codes are substantially orthogonal.

12. The method of claim 1 wherein each of the plurality of codes is a substantial portion of a code derived from a maximum length shift register sequence.

13. The method of claim 1 wherein at least some of the plurality of distinct digital codes are selected to avoid the effects of noise in the sensed signals.

14. The method of claim 1 further comprising the step of generating each of the plurality of distinct digital codes.

15. The method of claim 14 wherein the generating step comprises producing the plurality of distinct digital codes using at least one shift register.

16. The method of claim 1 wherein the modulation signals are applied substantially simultaneously for at least two of the plurality of electrodes.

17. The method of claim 1 wherein the demodulating step comprises receiving at least two of the sensing signals from the sensing region on a common signal path.

18. The method of claim 1 wherein the electrical effects result from an electrical coupling between the object and at least some of the associated electrodes.

19. The method of claim 18 wherein the electrical coupling is a capacitive coupling.

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20. The method of claim 18 wherein the electrical effects are obtained from an integrating capacitor coupled to at least two of the plurality of electrodes.

21. The method of claim 1 further comprising the steps of:

producing each of a plurality of complementary modulation signals as a function of complements of the plurality of distinct digital codes; and

applying each of the complementary modulation signals to the associated at least one of the plurality of electrodes to obtain a plurality of complementary sensed signals.

22. The method of claim 21 further comprising the steps of:

demodulating each of the plurality of complementary sensed signals using the distinct digital code associated with the at least one of the plurality of electrodes to thereby identify complementary electrical effects from the plurality of electrodes; and

comparing the electrical effects with the complementary electrical effects to thereby perform dual differential conversion.

23. The method of claim 1 further comprising the step of adjusting the distinct digital code subsequently applied to at least one of the plurality of electrodes in response to the plurality of sensed signals.

24. The method of claim 1 further comprising the step of adjusting at least one of the distinct modulation signals in response to the sensed signals.

25. The method of claim 1 further comprising the step of processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region.

26. The method of claim 25 wherein the object and the second object are separate parts of a human hand.

27. The method of claim 25 further comprising the step of rejecting information relating to the second object.

28. The method of claim 1 wherein the determining step comprises defining an image of the object.

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29. The method of claim 28 wherein the image represents a two-dimensional topography of the object projected upon the touch-sensitive region.

30. The method of claim 28 further comprising the step of processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region, the second object having a second image.

31. The method of claim 30 further comprising the step of tracking movements of the image and of the second image with respect to the touch-sensitive region.

32. The method of claim 30 further comprising the step of determining whether the second image represents an undesired input, and if so, rejecting the second image.

33. The method of claim 1 wherein the distinct digital codes have more than two states.

34. The method of claim 1 wherein the step of producing the plurality of unique modulation signals comprises amplitude modulating a carrier signal with each of the plurality of distinct digital codes.

35. The method of claim 1 wherein the plurality of electrodes comprises a first plurality of electrodes having a first orientation and a second plurality of electrodes having a second orientation.

36. The method of claim 35 wherein each of the plurality of unique modulation signals are applied to the first plurality of electrodes and received via the second plurality of electrodes.

37. The method of claim 35 further comprising the step of applying a guard signal to at least one inactive electrode of the second plurality of electrodes.

38. The method of claim 1 wherein the applying step comprises applying at least one of the unique modulation signals to at least two of the plurality of electrodes.

39. A touch-sensitive device for detecting a position-based attribute of an object, the device comprising:

a touch-sensitive region comprising a plurality of electrodes having electrical characteristics configured to be affected by the proximity of the object;

drive circuitry associated with each of the electrodes;

a demodulator coupled to the touch-sensitive region; and

a processor coupled to the drive circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of modulation signals as a function of a plurality of distinct digital codes, to initiate application of each of the plurality of modulation signals to said plurality of electrodes via the drive circuitry, to demodulate a sensed signal received from said sensing region using the digital codes to discriminate electrical effects produced by the object upon at least one sensing electrode, and to determine the position-based attribute of the object with respect to the plurality of electrodes from the electrical effects.

40. The device of claim 39 wherein the drive circuitry comprises an analog signal generator configured to generate a carrier signal and a modulator configured to amplitude modulate the carrier signal with each of the plurality of distinct digital codes to thereby produce the unique modulation signals.

41. The device of claim 39 wherein the touch sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user.

42. The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the electrical effects.

43. The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the positions of the plurality of electrodes relative to each other.

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44. The device of claim 39 wherein contact between the object and the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes.

45. The device of claim 44 wherein the at least two of the plurality of electrodes comprise a first electrode having a first orientation and a second electrode having a second orientation substantially perpendicular to the first orientation.

46. The device of claim 39 further comprising a capacitor electrically coupled to at least some of the plurality of electrodes and to the demodulator.

47. The device of claim 46 wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes.

48. The device of claim 39 wherein the object is a finger.

49. The device of claim 39 wherein the object is a stylus.

50. The device of claim 39 wherein the touch-sensitive region is formed on a flexible substrate.

51. A device for detecting a position-based attribute of an object with respect to a touch-sensitive region comprising a plurality of electrodes, the device comprising:

means for producing a plurality of distinct digital codes used to create a plurality of modulation signals applied to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the object;

means for demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the object; and

means for determining the position-based attribute of the object with respect to the plurality of electrodes from the electrical effects.

METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES

ABSTRACT

[0049] Methods, systems and devices are described for detecting a position-based attribute of a finger, stylus or other object with a touchpad or other sensor having a touch-sensitive region that includes a plurality of electrodes. Modulation signals for one or more electrodes are produced as a function of any number of distinct digital codes. The modulation signals are applied to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the object. The resultant signal is demodulated using the plurality of distinct digital codes to discriminate electrical effects produced by the object. The position-based attribute of the object is then determined with respect to the plurality of electrodes from the electrical effects.

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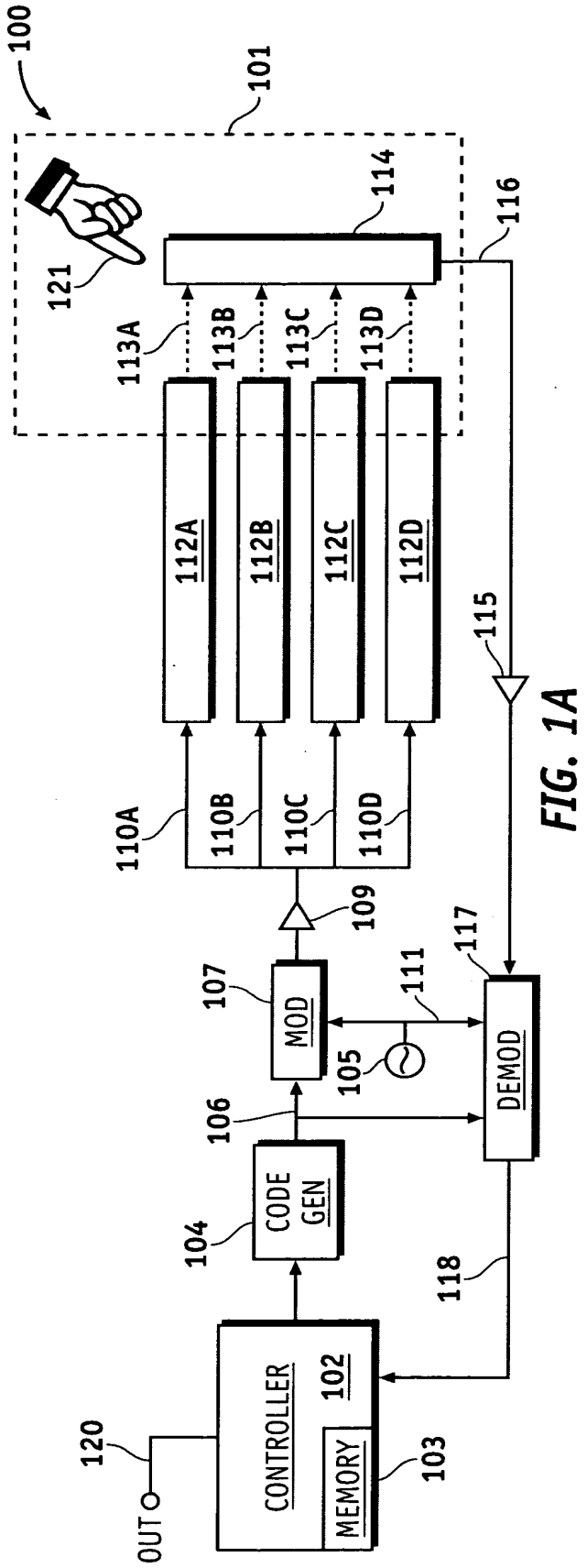


FIG. 1A

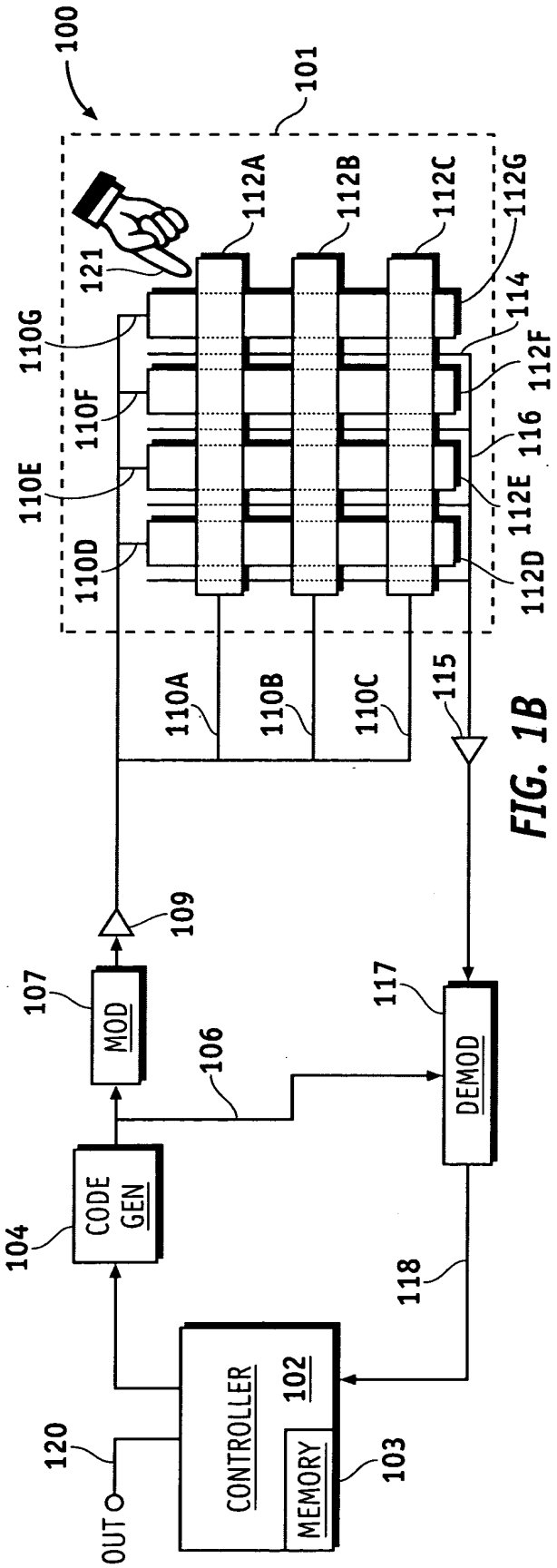


FIG. 1B

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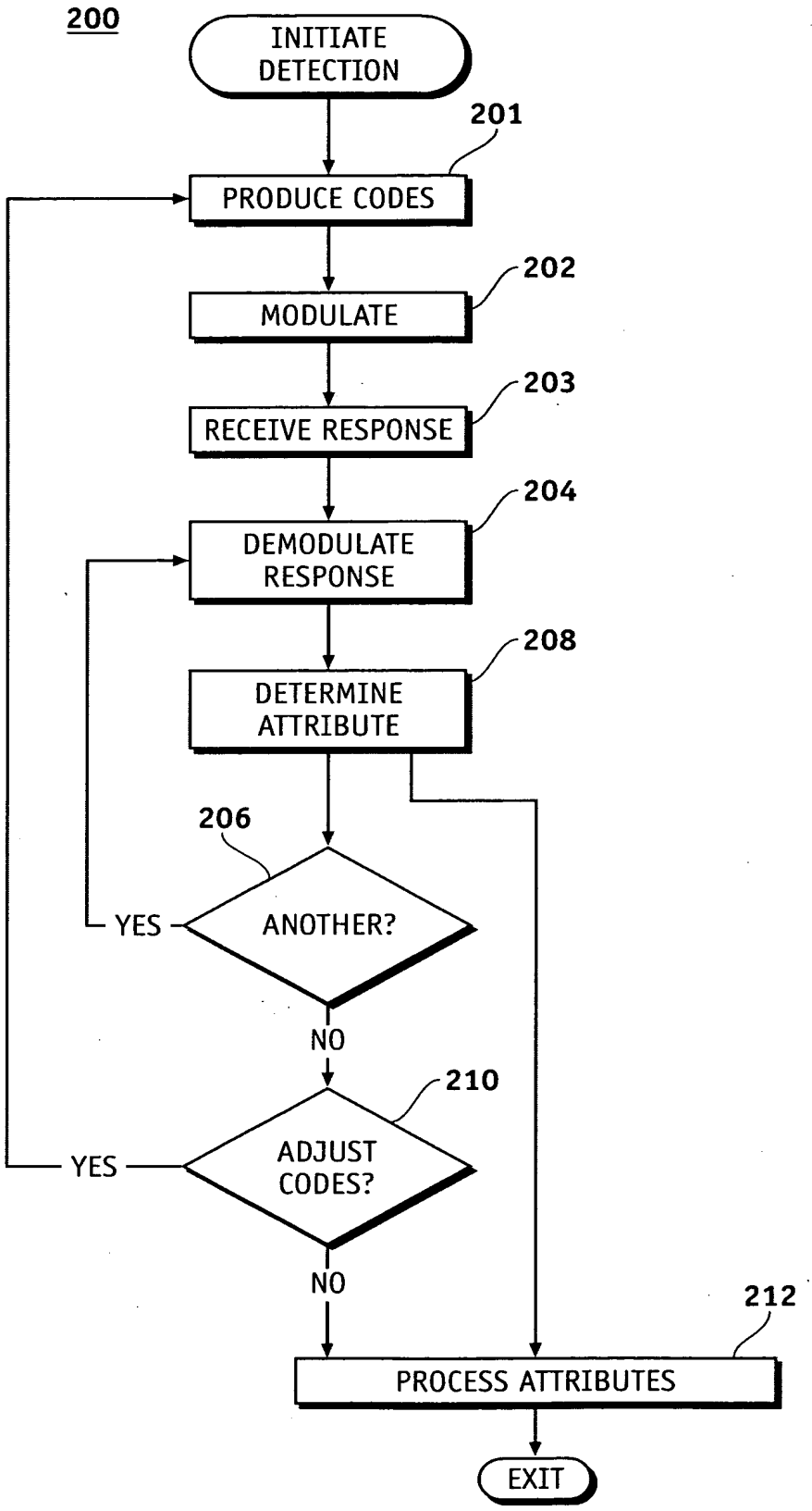


FIG. 2

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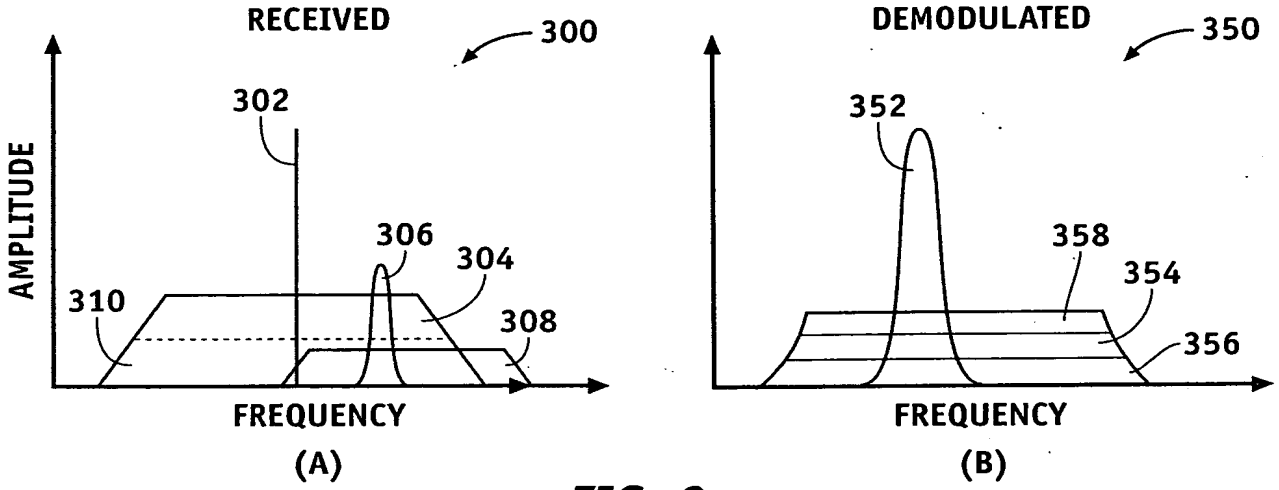


FIG. 3

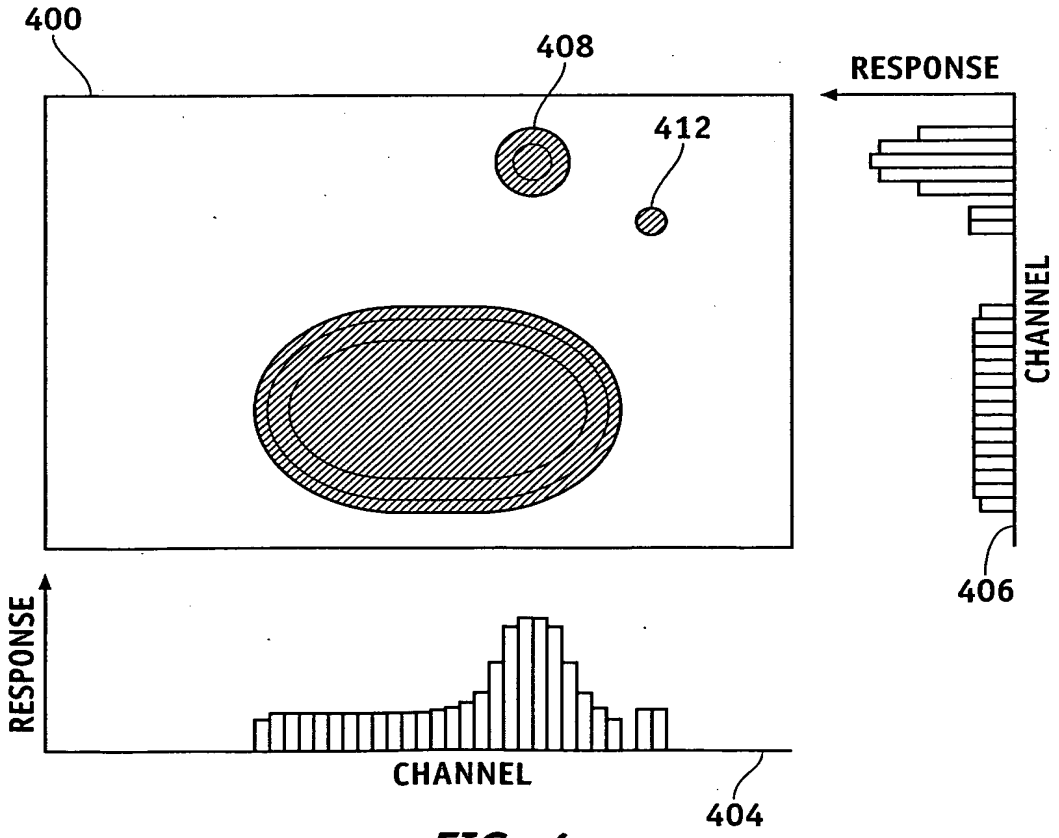


FIG. 4

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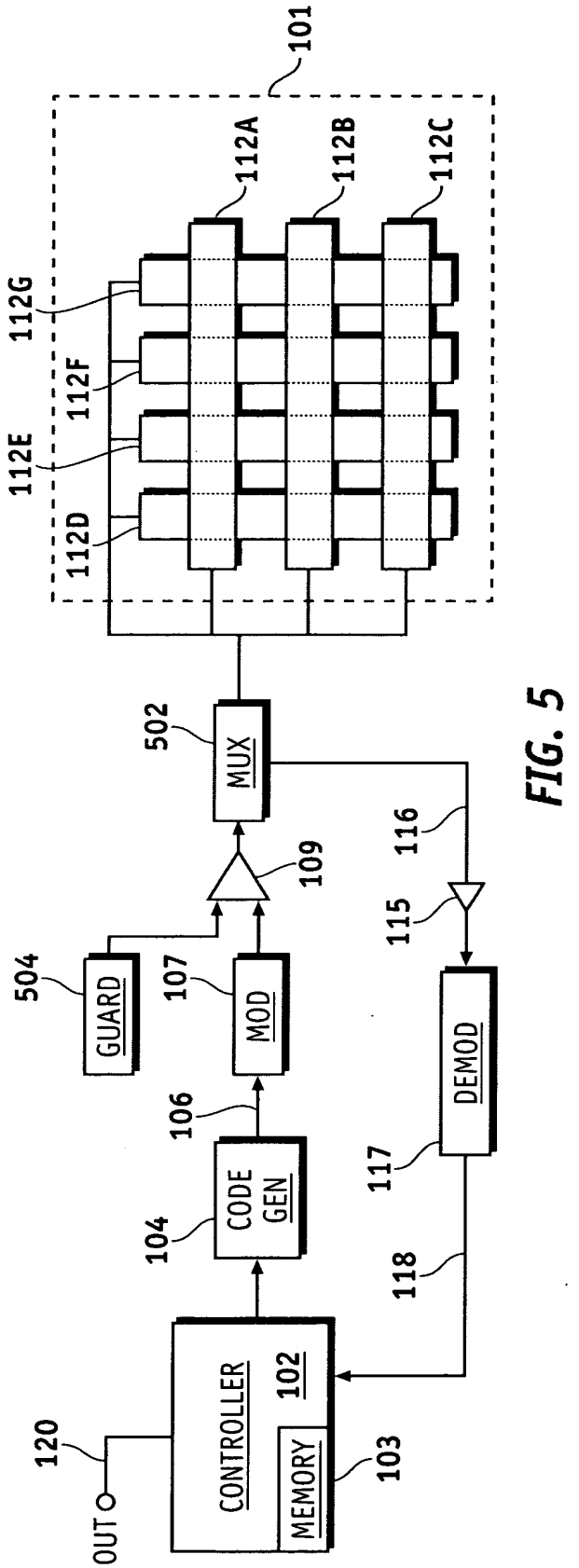

101
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112B
112C
112G
112F
112E
112D
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GUARD
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CODE GEN
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118
CONTROLLER
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MEMORY
103
120
OUT

FIG. 5

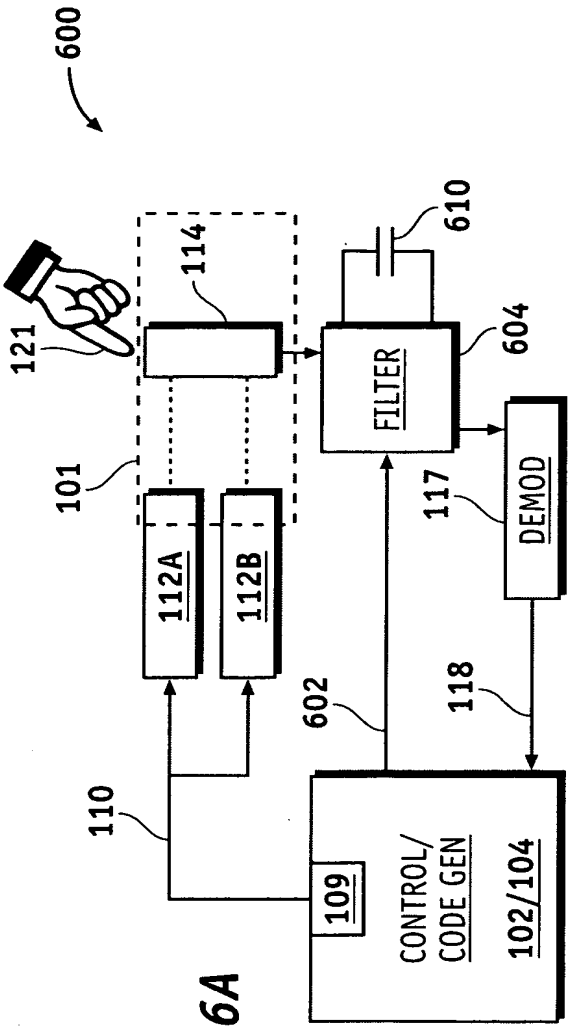

600
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CONTROL/
CODE GEN
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FIG. 6A

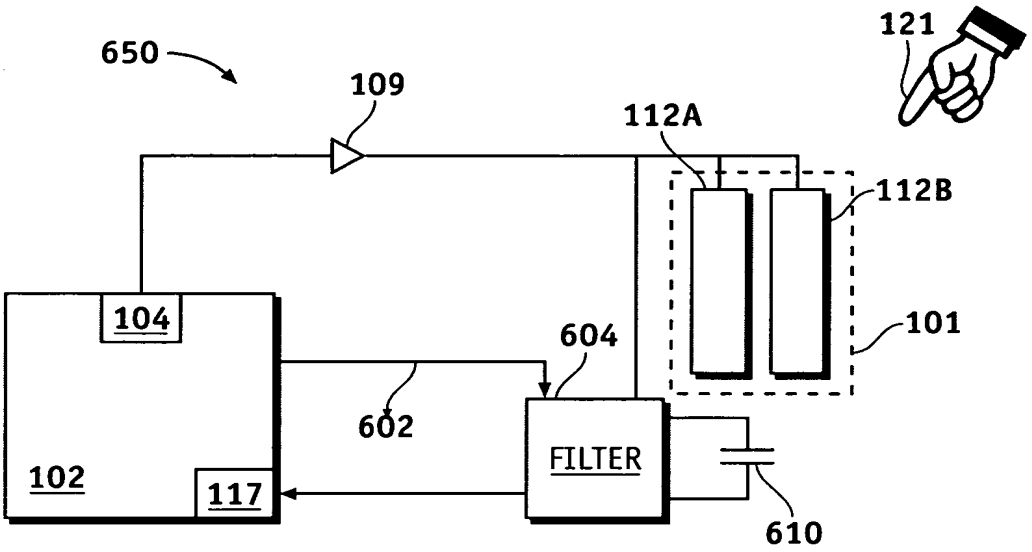


FIG. 6B

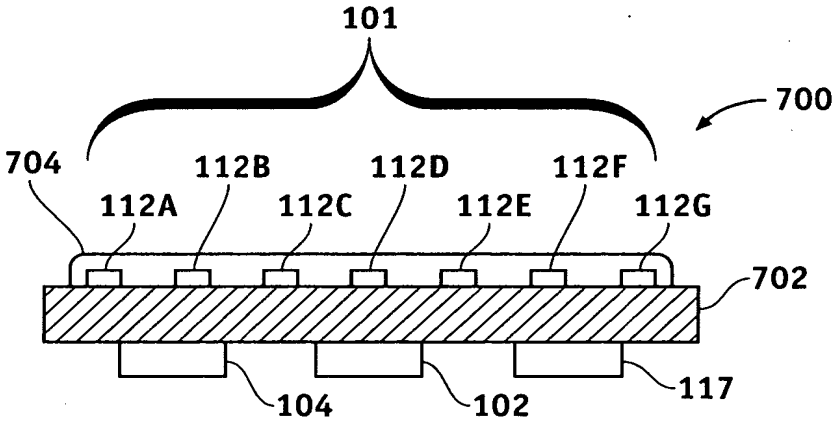


FIG. 7

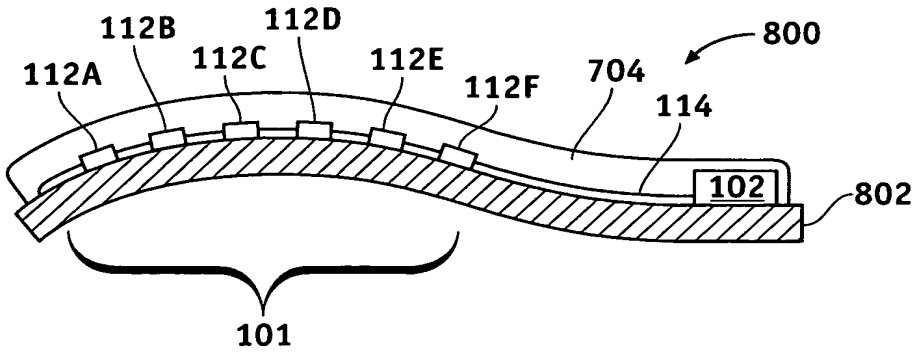


FIG. 8

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United States Utility Patent Application
Attorney Docket No.: 028.0013
First Named Inventor: J. Kurth Reynolds

COMBINED DECLARATION AND POWER OF ATTORNEY FOR A UNITED STATES UTILITY PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, mailing address, and country of citizenship are stated below next to my full name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter, which is claimed and for which a patent is sought on the invention entitled:

METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES

the specification of which:

[X] is attached hereto;

[ ] was filed on _____ and assigned U.S. application serial no. or PCT application no. _____;

[ ] and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above, if any.

I hereby acknowledge the duty to disclose information which is material to patentability as defined by 37 C.F.R. § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119 or 365 of any foreign application(s) for patent, inventor's or plant breeders rights certificate(s), listed below and have also identified below, any foreign application for patent, inventor's or plant breeders rights certificate(s), or of any PCT international application having a filing date before that of the application of which priority is claimed:

Foreign Application No.	Country	Foreign Filing Date

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States Provisional applications listed below:

Application No.	Filing Date

I hereby claim the benefit under 35 U.S.C. 120 or 365 of any United States application(s) or of any PCT international application designating the United States of America, listed below:

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U.S. Parent Application or PCT Parent No.	Country	Foreign Filing Date

As a named inventor I hereby also appoint Wendy Cheng (Reg. No. 51,555), Vincent B. Ingrassia (Reg. No. 25,732), John A. Fisher (Reg. No. 28,505), Timothy J. Lorenz (Reg. No. 41,954), Brett A. Carlson (Reg. No. 39,928), and the practitioners associated with Ingrassia Fisher & Lorenz, PC, Customer Number 29906 to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Direct all correspondence and telephone calls to the address and phone number associated with Customer Number 29906.

I hereby declare that all statements made herein of my own knowledge are true and that all statements on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Sole or First Inventor: J. Kurth Reynolds

Signature of Sole or First Inventor: J. Kurth Reynolds Date: 11/14/2005

Residence City: Sunnyvale Residence State: CA

Residence Country: USA Citizenship: USA

Home or Business Post Office Address: 3120 Scott Blvd. Ste 130

City: Santa Clara State: CA Zip Code: 95054

_____ State: _____ Zip Code: _____

PATENT APPLICATION SERIAL NO _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

11/18/2005 AKELECH1 00000036 11274999

01 FC:1011	300.00	OP
02 FC:1111	500.00	OP
03 FC:1311	200.00	OP
04 FC:1202	1550.00	OP

PTO-1556
(5/87)

*U.S. Government Printing Office: 2002 — 466-267/69033

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PTO/SB/06 (12-04)
Approved for use through 7/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875 Effective December 8, 2004

Application or Docket Number

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	150.00		N/A	300.00
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	$250		N/A	$500
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	$100		N/A	$200
TOTAL CLAIMS (37 CFR 1.16(i))	51 minus 20 =	31	X$ 25 =		OR	X$50 =	1550.-
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	—	X100 =			X200 =	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			+180=			+360=	—
			TOTAL			TOTAL	2550.-

* If the difference in column 1 is less than zero, enter "0" in column 2.

1,39 51

APPLICATION AS AMENDED – PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X$ 25 =		OR	X$50 =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X100 =		OR	X200 =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					+180=		OR	+360=	
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X$ 25 =		OR	X$50 =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X100 =		OR	X200 =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					+180=		OR	+360=	
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UTILITY PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of: J. Kurth Reynolds | Group Art Unit:

Serial No.: | Examiner: Unknown

Filed: 11/15/2005 | Attorney Docket No.: 028.0013

For: METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P O Box 1450
Alexandria, VA 22313-1450

Commissioner:

In accordance with 37 C.F.R. 1.56 and in a manner prescribed by 37 C.F.R. 1.97 and 1.98, this Information Disclosure Statement IDS is being submitted herewith for consideration by the United States Patent and Trademark Office.

I. CONTENT

This IDS includes:

☒ A list of all patents, publications, applications, or other information submitted for consideration by the Office on PTO/SB/08A Form, which is included herewith;

☒ If required, a legible copy of: (i) each U.S. patent application publication and U.S. and foreign patent; (ii) each publication or that portion which caused it to be listed; and (iii) each cited pending U.S. application, the application specification including claims, and any drawing of the application, or that portion of the application which caused it to be listed including any claims directed to that portion; and (iv) all other information or that portion which caused it to be listed, unless subsequently provided in this IDS.

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II. CONCISE EXPLANATION OF THE RELEVANCE (check at least one box)

☒ Except as may be subsequently indicated in this section II, a concise explanation is not required as all of the patents, publications, applications or other information are in the English language, or the degree of relevance of each is indicated in the English language version of the International Search Report, which accompanies this IDS.

☐ A concise explanation of the relevance, as it is presently understood by the individual designated in 1.56(a) most knowledgeable about the content of the information, of all patents, publications, applications or other information listed that is not in the English language.

☐ A copy of the translation of a non-English Language document, or portion thereof. (e.g., a translation of an abstract)

☐ Any patent, publication, pending U.S. application or other information that is listed on PTO/SB/08A Form, which are not enclosed herewith were previously cited by or submitted to the Office in one of the following applications that has been relied on for an earlier effective filing date under 35 U.S.C 120 and the IDS submitted in the earlier application complies with paragraphs (a) through (c) of 1.98:

U.S. Application Serial No.	U.S. Filing Date

III. THIS IDS IS BEING FILED UNDER 37 C.F.R. 1.97(b): (check one box)

☒ Within three months of the filing date of a national application other than a continued prosecution application under 1.53(d).

☐ Within three months of the date of entry of the national stage as set forth in 1.491 in an international application.

☐ Before the mailing date of a first Office Action on the merits. In the event that a first Office Action on the merits has been mailed, please consider this IDS under 37 C.F.R. 1.97(c) and see the statement under 1.97(e) **or** charge deposit account 50-2091 the fee specified by 37 C.F.R. 1.17(p) if such statement is not selected in Section VI.

☐ Before the mailing of a first Office Action after the filing of a request for continued examination under 1.114.

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IV. THIS IDS IS BEING FILED UNDER 37 C.F.R. 1.97(c):

☐ After the period specified in 27 C.F.R. 1.97(b) and before the mailing date of any of a final action under 1.113, a notice of allowance under 1.311 or an action that otherwise closes prosecution in the application, and accompanied by:

☐ a statement specified in 1.97(e) as subsequently provided in this IDS; or

☐ the fee set forth in 1.17(p).

V. THIS IDS IS BEING FILED UNDER 37 C.F.R. 1.97(d):

☐ After the period specified in 27 C.F.R. 1.97(c) and on or before the payment of the issue fee, and it is accompanied by a statement specified in 1.97(e) as subsequently provided in this IDS **and** the fee set forth in 1.17(p).

VI. Statement under 37 C.F.R. 1.97(e) (check only one box)
The undersigned hereby states that:

☐ Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS.

☐ No item of information contained in the IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the IDS was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this IDS.

VII. Statement under 37 C.F.R. §1.704(d)

☐ The undersigned hereby states that each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart application and that this communication was not received by any individual designated in 37 C.F.R. §1.56(c) more than thirty days prior to the filing of the information disclosure statement.

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VIII. PAYMENT OF FEES (check one box)

☐ A check in the amount of $_____ is enclosed for fees due with respect to this IDS.

☐ Please charge Deposit Account No. _____ in the amount of $_____ for the fees due with respect to this IDS. A duplicate copy of this paper is included with this IDS.

IX. CONCLUSION

It is respectfully submitted that the claims presently on file patently distinguish the present invention from each of these references cited in this IDS. The references cited in this IDS are being cited only in the interests of candor and without any admission that they constitute statutory prior art or contain matter which anticipates the invention or which would render the same obvious, either singly or in a combination, to a person of ordinary skill in the art. Furthermore the filing of this IDS should not be construed to be an admission that the information cited in this IDS is, or is considered to be, material to patentability as defined in 1.56(b). In addition, the filing of this IDS should not be construed as a representation that a search has been made.

If the Examiner has any questions concerning these IDS, the Examiner is requested to contact the undersigned at the telephone number associated with Customer No. 29,906. If it is determined that this IDS has been filed under the wrong rule, the PTO is requested to consider this IDS under the proper rule, with a petition if necessary, and charge the appropriate fee to Deposit Account No. 50-2091.

Please charge any additional fees or credit any overpayment related to this IDS to Deposit Account No. 50-2091.

Respectfully submitted,

Date: November 15, 2005

By: _____
Brett A. Carlson
Reg. No. 39,928

Ingrassia Fisher & Lorenz
Customer Number 29906

Enclosures:
- ☒ PTO/SB/08A
- ☒ References (10)
- ☐ Foreign Search Report
- ☐ Fee
- ☐ Other:_____

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PTO/SB/08A (07-05)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 3

Complete if Known	
Application Number	
Filing Date	11/15/2005
First Named Inventor	J. Kurth Reynolds
Art Unit	
Examiner Name	
Attorney Docket Number	028.0013

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 4,170,025	10-02-1979	Benkley et al.	
		US- 4,459,541	07-10-1984	Fielden et al.	
		US- 5,305,017	04-19-1994	Gerpheide	
		US- 5,666,113	09-09-1997	Logan	
		US- 5,790,106	08-04-1998	Hirano et al.	
		US- 5,825,352	10-20-1998	Bisset et al.	
		US- 5,861,875	01-19-1999	Gerpheide	
		US- 5,917,906	06-29-1999	Thornton	
		US- 6,570,557 B1	05-27-2003	Westerman et al.	
		US- 6,704,005 B2	03-09-2004	Kato et al.	
		US- 6,771,280 B2	08-03-2004	Fujisaki et al.	
		US- 6,788,288 B2	09-07-2004	Ano	
		US- 2003/0030628 A1	02-13-2003	Sato et al.	
		US- 2003/0035570 A1	02-20-2003	Benkley, III	
		US- 2004/0081339 A1	04-29-2004	Benkley, III	
		US- 2005/0005703 A1	01-13-2005	Saito et al.	
		US- 2005/0024065 A1	02-03-2005	Umeda et al.	
		US- 2005/0052425 A1	03-10-2005	Zadesky et al.	
		US- 2005/0073324 A1	04-07-2005	Umeda et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
		WO 02/47018 A2	06-13-2002	Metro Engineering Assoc.		
		WO 2004/107146 A2	12-09-2004	Therefore Limited		

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Sheet 2 of 3

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Application Number	
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U. S. PATENT DOCUMENTS

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	028	US- 2002/0049070 A1	04-25-2002	Bick	
		US- 2005/0122785 A1	06-09-2005	Umeda et al.	
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Sheet 3 of 3

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		SMITH, ET AL.; "Code-Division Multiplexing of a Sensor Channel: A Software Implementation"; IEEE Journal; April, 1999; pp 725-731; Vol. 17, No. 4.	
		CICHOCKI, ET AL.; "A Switched-Capacitor Interface for Capacitive Sensors Based on Relaxation Oscillators"; IEEE Journal; October, 1990; pp 797-799; Vol. 39, No. 5.	
		HUANG, ET AL.; "Electronic Transducers for Industrial Measurement of Low Value Capacitances"; J. Phys. E: Sci. Instrum. 21 1988; pp 242-250; IOP Publishing Printed in the U.K.	
		PHILIPP, HAL; "Charge Transfer Sensing", pp 1-9; Copyright 1997.	
		ZIMMERMAN, ET AL.; "Applying Electric Field Sensing to Human-Computer Interfaces", MIT Media Laboratory; pp 1-8; to be published in (IEEE SIG) CHI May 1995.	
		YAMADA, ET AL.; "A Switched-Capacitor Interface for Capacitive Pressure Sensors", IEEE Journal; Feburary, 1992; pp 81-86; Vol. 41, No. 1.	
		SMITH, ET AL.; "Electric Field Sensing for Graphical Interfaces"; IEEE Computer Graphics and Applications; May/June 1998; pp 54-60.	
		VIGODA, BENJAMIN; "A Nonlinear Dynamic System for Spread Spectrum Code Acquisition"; MIT Media Laboratory; pp 10-90.	

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(71) Applicant *(for all designated States except US)*: **THEREFORE LIMITED** [GB/GB]; 2 Huntsworth Mews, London NW1 6DD (GB).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **RIDDIFORD, Martin** [GB/GB]; Therefore Limited, 2 Huntsworth Mews, London NW1 6DD (GB).

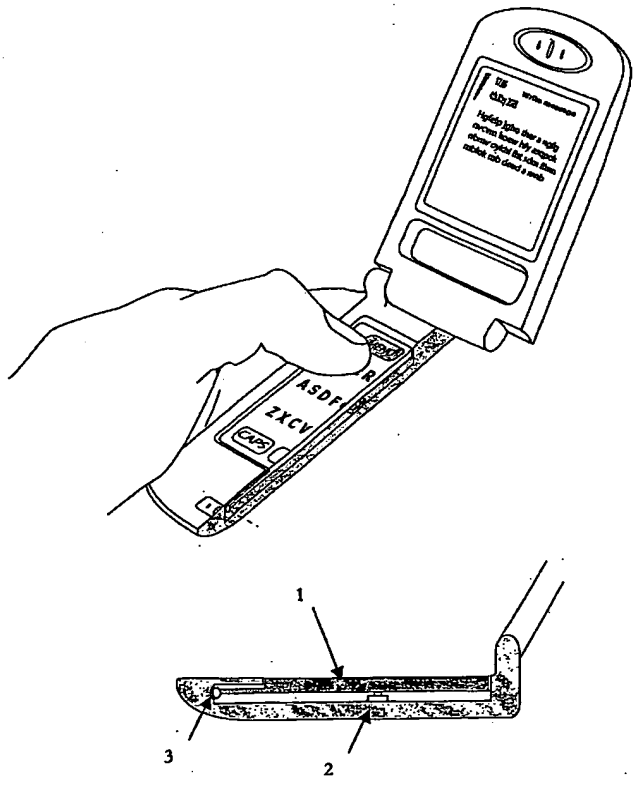
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(54) Title: A DATA INPUT METHOD FOR A COMPUTING DEVICE



(57) Abstract: A data input method for a computing device using a touch screen; selection of a virtual key occurs when a user presses down on the screen overlying the virtual key with a force exceeding a first pre-defined force and confirmation of selection of a virtual key occurs when the user presses *down* on the screen overlying the virtual key with a force exceeding a second pre-defined force and actuates a mechanical switch underlying the touch screen. Confirmation of selection in this manner provides tactile feedback missing from conventional touch screen systems. Because it more closely mimics a real world action of hitting a real world key, it is both more satisfying and more easily understood by a user. The invention stands in contrast to the established view that confirmation of the selection of a virtual key should be achieved when a user lifts off from the screen and without any form of tactile feedback.

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A DATA INPUT METHOD FOR A COMPUTING DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a data input method for a computing device using a touch screen. It enables 'virtual keys' to be selected.

2. Description of the Prior Art

The term 'computing device' covers any kind of computing device that a person interacts with by selecting virtual keys that are shown on a display. As such, the term covers PDAs, mobile telephones, dedicated devices such digital audio players, remote control units, desktop PCs etc. The term 'key' should be expansively construed to cover any object which a user would 'select' in some way (e.g. choose in order to: (a) input data, such as text/numeric data; (b) initiate an action; (c) control or manipulate a function; or (d) to identify data which is to be manipulated). It therefore covers keys or tiles from a keyboard (such as letter or number keys), a control button or slider, a jog dial, a joystick, or a roller button etc. These 'keys' may be generated by the computing device and shown on the display (e.g. a LCD display). Alternatively, the keys may be permanently formed on a layer which can be illuminated by an electroluminescent screen. A 'virtual key' is therefore an image of a key which only appears when caused to do so by a computing device. The term 'virtual key' also covers items that do not correspond with objects as such; in particular, it covers any icon or image (a) which a user might select and (b) which only appears when caused to do so by a computing device.

Operating a 'virtual key' can be done in several ways and is a two stage process. First, a user has to *select* a key. Subsequently, the user has to *confirm* selection. In a PC environment, the user could point at a virtual key to select that virtual key and then click with a mouse to confirm selection. Where the computing device has a touch screen, then the user would simply touch the area of the display overlying the virtual key with a finger, pen or stylus to select that virtual key; when he lifts his finger/pen off the screen, the selection of the virtual key is confirmed. A synthetic audio 'click' is sometimes generated

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to provide feedback of confirmation. It is a common mis-conception that touch screens confirm selection of a virtual key when pressure is applied; they in fact confirm only when pressure is released.

Touch screens typically comprise an ITO layer overlying a display (such as a LCD) and are pressure sensitive. When pressure is applied to the ITO overlay, the top flexible surface is locally deformed so that it makes contact with a stiff /solid base layer. An analogue voltage level across the ITO coating on the inside surface layer is interpreted by the computer to give x/y coordinates for the pressure point. Feedback indicating that a key has been selected is often given by highlighting the zone which has been touched on the underlying LCD, or animating a button to look like it has been pressed. Movement of the point of contact can then change the highlighted zone, highlight a word, or be used for pull down menus, or for digital ink etc. Confirmation of selection of a particular virtual key occurs only when the pressure is released.

Because conventional touch screens enable the contact point to be moved so that different screen areas can be selected whilst the pen/stylus is 'down', 'drag and drop' is generally avoided since it would require that a selected item is dragged when the contact point is moved.

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SUMMARY OF THE INVENTION

The invention is a data input method for a computing device using a touch screen; selection of a virtual key occurs when a user presses down on the screen overlying the virtual key with a force exceeding a first pre-defined force and confirmation of selection of the virtual key occurs when the user presses *down* on the screen overlying the virtual key with a force exceeding a second pre-defined force and actuates a mechanical switch underlying the touch screen.

Confirmation of selection in this manner provides tactile feedback missing from conventional touch screen systems. Because it more closely mimics a real world action of hitting a real world key, it is both more satisfying and more easily understood by a user. The invention stands in contrast to the established view that confirmation of the selection of a virtual key should be achieved when a user lifts off from the screen and without any form of tactile feedback. It should be noted that the conventional approach of confirming selection only on release is simpler, but less effective. It is simpler because it requires no secondary mechanical switch; this inherent simplicity has led to the overwhelming technical bias in the field of touch screens being towards preserving pressure release as the indication of confirmation of key selection.

The step of selection of a key (which clearly has to precede confirmation of that selection) may also be associated with various forms of feedback to clearly indicate to the user that a particular key has been selected. For example, visual feedback is possible: when the user selects a virtual key (but without pressing on it so hard that the switch is actuated and selection thereby confirmed), the virtual key could change colour, or a preview window could open, showing the identity of the particular key that has been selected. Hence, as the user moves over different keys with this light pressure, different keys are shown as being selected.

Voice feedback is also possible: the name of a key that has just been selected could be spoken by a synthetic voice. This approach would be very useful when selecting keys on a device whilst driving – e.g. dialling a telephone number on a mobile telephone. It would also be very useful to blind/visually impaired users. As polyphonic sound quality improves, it will also be possible to use voices belonging to different pop stars, actors

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etc, with users downloading the appropriate sound files needed in the same way that ringtones can be bought and downloaded today. Another feedback approach is the use of low profile guide lines or tactile features on the touch screen itself, so that the user's sense of touch can also be used to aid the process of selection.

Actuation of the switch that occurs when the user presses down on a virtual key beyond the first pre-defined force may cause a control signal to be sent from the switch to result in that virtual key being selected. The switch then acts as a gate, so that the X-Y co-ordinates continuously sensed by the touch screen as the user brushes against the screen above the first pre-defined force but below the second pre-defined force threshold (i.e. without actuating the switch) does not result in erroneous key selection confirmation; instead, the user must positively press down in excess of the second threshold to actually confirm selection of the key. Actuation of the switch then triggers the immediate capture and use of X-Y co-ordinates of the area that is being pressed down upon, as measured by the touch screen system.

If the virtual key is an item that can be dragged, then a light touch on it, sufficient to identify the touch position to the touch screen but not enough to activate the switch, will select that item. The item can then be dragged and dropped in the normal manner.

The present invention can be implemented using a conventional ITO layer overlying a LCD display. The switch underlying the touch screen can be a single (or multiple) switch which is actuated when the touch screen is pressed with a force above a pre-defined threshold. In one implementation, the whole touchscreen and LCD assembly are mounted in a combined unit hinged at one edge with the back of the unit resting on the switch, with the switch mounted in a suitable position so that the force to actuate the switch in normal use does not vary beyond a pre-defined and limited extent across the entire touch screen – i.e. the hinge axis is far away from finger press area. Two switches may also be practical for larger areas. Other switch variants, such as that disclosed in EP0419145, are also possible. The switch is preferably an electro-mechanical contact switch.

The switch provides one or more of the following advantages:

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A. It gives tactile feedback, with the user sensing the slight movement of the hinged touch screen pivoting; it feels just like pressing mechanical keys, unlike a conventional touch screen. No such tactile feedback arises with conventional touch screens.

B. It positively confirms the selection of a virtual key, whilst still allowing hovering before confirmation – i.e. the user is made aware that he has actually confirmed selection of a virtual key through the movement associated with the screen pivoting. But the user can still draw his finger over an area without confirming selection of the underlying keys if the pressure is light enough, but once he presses with a force exceeding a threshold, the switch positively closes, confirming selection of the underlying key. Hence, the mechanical switch acts as a gate so that the X-Y co-ordinates continuously sensed as the user brushes against the screen at below a pre-defined force level (i.e. without actuating the switch) does not result in erroneous confirmation of key selection; instead, the user must positively press down in excess of a threshold to confirm selection of the key.

C. It switches at the same time as selection is confirmed, i.e. actuation of the switch triggers the immediate capture and use of the X-Y co-ords of the area that is being pressed down upon, as measured by the ITO system, unlike conventional touch screen systems in which a user can press down on a virtual key but the actual switching occurs only later on release.

D. It gives mechanical audio feedback when the switch is fully depressed, unlike a conventional touch screen which requires a synthetic audio feedback.

E. Drag and drop is possible, with an item to be dragged being selected by a light press down action that does not actuate the switch but can nevertheless be sensed by the touch screen; with pressure maintained, the user can then drag the selected item and drop it at the required destination by lifting up. Another approach would be for the item only to be dragged after confirmation of selection had been made – i.e. a press down hard enough to activate the mechanical switch.

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The item can then be dragged whilst pressure is maintained and dropped by releasing. This mirrors how drag and drop is achieved using a normal mouse. This latter approach can also be used to highlight text and multiple icons in the same way that a mouse can highlight, i.e. the user presses down at the start of the region to be highlighted with a force sufficient to activate the switch and then, with pressure maintained, drags the contact point to the end of the region being highlighted.

F. Various forms of feedback are possible on selection (but prior to confirmation), such as audio, tactile or visual feedback.

The mechanical switch does not have to gate the touch screen output in the manner described above: it may simply provide tactile feedback. Then, a touch screen could employ a controller modified so that confirmation of key selection occurs on a 'pen down' rather than a 'pen up' action. Positive confirmation of key selection can then be achieved by having a touch screen that can position sense once the touch force exceeds one level, and trigger confirmation of key selection only if a force exceeding a higher level is applied. This approach does however require a more costly type of touch screen.

Several virtual keys may be displayed in proximity to one another and any ambiguity in the identify of the key which the user intended to select is resolved by disambiguation software running on the device. Hence, virtual keys for all letters of the alphabet could be displayed (e.g. a QWERTY or ABCD ordered keypad) and/or numerics 0 to 9. An input to the disambiguation software could be the proximity of a touch to a given area or point uniquely associated with a given key. Hence, the software relates the likelihood of a given key being the correct key to the proximity of the actual strike area on the touch screen to that of the key.

There may be no delineation between one or more of the virtual keys – e.g. the display simply shows an array of letters, with no apparent key tiles. This leads to a cleaner, less cluttered display.

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Another feature is that the device could display different virtual keys depending on the application being used by the user or the appropriate inputs needed for a given application. Hence, if the device was a smartphone, it could display a virtual QWERTY keyboard if the user activates a messaging application, or controls for a digital audio player if a digital audio application is opened.

The device may also comprise a touch screen ITO layer on the left side of the device to receive input from the left hand and a second touch screen ITO layer on the right side to receive input from the right side. This is useful for portable devices that are meant to allow two handed data input (e.g. to allow games to be played). Having two separate ITO layers, each with its own controller, overlying the virtual keys for each different hand allows simultaneous input from each hand: with a single ITO layer overlying the entire screen, a simultaneous input to the far left of the screen and to the far right would be averaged out to represent a touch to the center of the screen – clearly inappropriate for a device that should allow two handed input.

The device might use a backlit electroluminescent display which comprises several different layers, each layer comprising a different set of virtual keys. Hence, one layer could be a numeric keypad, another layer could be a QWERTY keypad, another control buttons for a TV remote control etc.

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DETAILED DESCRIPTION

The present invention is implemented as the Cliqa™ virtual keyboard from Therefore Limited product design consultants of London, UK. The Cliqa virtual keyboard addresses the problem of how the smartphone keyboard should evolve, given that smartphone size will stay the same, yet screens will get bigger, applications more complicated and text input become more important.

The conventional solution is arguably a compromise in usability. For example, with a typical flip phone, the keyboard already requires at least 20 multi- function keys to manage the proliferation of applications, as shown in **Figure 1.**

The Cliqa virtual keyboard addresses this problem through a single intelligent key, as shown in the lower leaf of the flip phone in **Figure 2.** The Cliqa virtual keyboard is an assembly of a mono touch-screen LCD **1** with an electro-mechanical 'click' or dome switch **2** underneath, as shown in **Figure 3.** The screen **1** is hinged at pivot **3** running along one edge. The 'click' switch **2** is a conventional metal dome switch that deforms gradually under increasing force applied by a user's finger tip/stylus, and at a certain position, deforms rapidly and easily, giving the use a clear impression that the switch has been activated at that position. The Cliqa virtual keyboard displays virtual keys, always appropriate to the task at hand, but with a real mechanical key click action. An initial light press on the Cliqa virtual keyboard can select an item displayed on the touch-screen: the touch screen ITO has sensed the contact position over the item and can hence highlight that item. Only with a more positive press, sufficient to actuate the switch, is the item confirmed for selection, in the sense of being committed for data entry.

A firm press on the touch screen, as shown in **Figure 4,** causes the switch to actuate: the touch screen and display are a combined unit, hinged at one end and resting on the switch. As the combined unit is depressed beyond a certain distance, the switch is actuated. The switch acts as a gate, with actuation of the switch triggering the immediate capture and use of the X-Y co-ordinates of the area that is being pressed down upon, as measured by a conventional ITO touch screen system. This confirms selection of the virtual key being pressed. On lifting up from the screen, the combined touch screen and

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display pivot back upwards, as shown in **Figure 5** under the action of a spring or deformable member The tactile experience is hence very close to a user pressing down on a real key.

Single-handed QWERTY input is achieved using enhanced predictive text (disambiguation) software. Normally, predictive text software cannot make any assumptions about which key the user intended to select prior to running its dictionary look up process. The Cliqa virtual keyboard can since it can measure the distance of the contact point or area to different keys and weight more heavily the key which is closest to the strike area.

The Cliqa virtual keyboard can be virtually split for two-handed operation (gaming), as suggested in **Figure 6**: two ITO layers are used; this will typically be a single physical layer divided into two logical sides, e.g. inputs to one side are independent of inputs to the other side and do not interfere with one another.

Figure 7 is an illustration of various possible Cliqa virtual keyboard phone interfaces, as amplified in Figure 8 – 13. **Figure 8** is an illustration of how numeric virtual keys can be used for a smartphone interface. A clear preview window onto the LCD provides Caller ID when the phone is closed, without the need for a third LCD.

Figure 9 shows how a QWERTY letter virtual keyboard can be deployed. Because the keyboard is virtual, it can readily be made to show the actual font that will be deployed – e.g. font type, upper case/lower case, italics, bold etc. **Figure 10** shows how a MP3 virtual keyboard could appear. **Figure 11** shows how an in-car navigation interface might appear. **Figure 12** shows how a photo album interface might appear. **Figure 13** shows how a mouse pad interface might appear. All of these interfaces could be available on the same device at different times, depending on the application that was being run.

Figure 14 shows several devices; moving clockwise from the top left, there is a universal remote control, a bar phone and a Bluetooth watch/controller, all using the Cliqa virtual keyboard concept to provide tactile confirmation of virtual key selection.

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Figures 15 – 18 show another variant in which there is a hinged panel 4 that in one position overlies at least part of a display 5, the hinged panel 4 is the screen that the user presses down on to select and confirm selection of virtual keys. It itself comprises a translucent panel 6 through which virtual keys shown on the display 5 are visible. The hinged panel 4 may include the device microphone. This variant is easier to integrate into current device designs since it requires minimal changes: the display 5 is a touch screen display and can be activated by a user pressing on the translucent panel 6. The hinged panel 4 is mounted against a simple mechanical switch to detect pressure sufficient to confirm selection of a virtual key as described above. **Figure 15** shows the device displaying a numeric keypad for dialing etc. **Figure 16** shows the device with panel 4 open – this shows how the screen 5 displays the numeric keypad in an entirely conventional manner; the numeric keypad can still be used in the conventional way using touch screen 5. Other virtual keys can be displayed: **Figure 17** shows a set of calculator virtual keys that the closed panel 4 overlies. The calculator virtual keyboard can be simply generated using conventional programming techniques and can float, as shown in **Figures 18 and 19**. Figures 15 – 18 depict a variant in which the display is sub-divided into different regions, with different touch related rules applying to the different regions. In the implementation described in Figures 15 – 18, the boundary between the region that operates the Cliqa system is clear – it is only the area underlying the translucent panel 6. For the rest of the display, conventional touch input behaviour still applies. The boundary need not however be so explicit; it is possible for a device to have a single display, fully overlaid with a hinged Cliqa system (or integrated with a Cliqa system) and for only certain regions of the display to activate Cliqa functionality. For example, the lower third could be a Cliqa touch pad zone, with the upper two thirds behaving conventionally. This may have some UI benefits – for example, all virtual keys could appear solely in the Cliqa touch pad zone, leaving the rest of the display able to accept conventional pen input.

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CLAIMS

1. A data input method for a computing device using a touch screen, in which (a) selection of a virtual key occurs when a user presses down on the screen overlying the virtual key with a force exceeding a first pre-defined force and (b) confirmation that a virtual key is selected occurs when the user presses down on the screen overlying the virtual key with a force exceeding a second pre-defined force, and actuates a switch underlying the touch screen.

2. The method of Claim 1 in which actuation of the switch that occurs when the user presses down on a virtual key causes a control signal to be sent from the switch that results in that virtual key being confirmed as selected.

3. The method of Claim 2 in which the step of actuation of the switch triggers the immediate capture and use of X-Y co-ordinates of the area that is being pressed down upon, as measured by an ITO touch screen system.

4. The method of Claim 1 in which the switch provides mechanical audio feedback of its actuation.

5. The method of Claim 1 in which 'drag and drop' is possible, in which the step of selecting a virtual key to be dragged is achieved when the user presses down on the virtual key with a force above the first pre-defined force but not exceeding the second pre-defined force, the step of dragging is achieved when the user alters the contact point at which he presses down and the step of dropping is achieved when the user lifts off from the screen.

6. The method of Claim 1 in which 'drag and drop' is possible, in which the step of selecting a virtual key to be dragged is achieved when the user presses down on the virtual key with a force above the second pre-defined force, the step of dragging is achieved when the user alters the contact point at which he presses down and the step of dropping is achieved when the user lifts off from the screen.

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7. The method of Claim 1 in which highlighting is possible, in which the step of selecting a virtual key to be highlighted is achieved when the user presses down on the virtual key with a force above the second pre-defined force, the step of marking text to be highlighted is achieved when the user moves the contact point at which he presses down over all of the text to be highlighted and the step of confirming selection is achieved when the user lifts off from the screen.

8. The method of Claim 1 in which the mechanical switch is arranged so that the second pre-defined force does not vary beyond a pre-defined and limited extent across the entire touch screen.

9. The method of Claim 1 in which several virtual keys are displayed in proximity to one another and any ambiguity in the identify of the key which the user intended to select is resolved by disambiguation software running on the device which relates the likelihood of a given key being the correct key to the proximity of the actual strike area on the touch screen to that of the key.

10. The method of Claim 9 in which virtual keys for all letters of the alphabet are displayed.

11. The method of Claim 10 in which there is no delineation between one or more of the virtual keys.

12. The method of Claim 7 in which a numeric keypad is displayed.

13. The method of Claim 1 in which the device can display different virtual keys depending on the application being used by the user or the appropriate inputs needed for a given application.

14. The method of Claim 1 in which the step of selection of a key that occurs prior to confirmation of that selection is accompanied by audio, visual and/or tactile feedback.

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15. The method of Claim 14 in which the audio feedback is the name of the key generated by a synthetic voice.

16. The method of Claim 14 in which the visual feedback is the identity of the key displayed in a preview window.

17. The method of Claim 14 in which the tactile feedback arises from low profile guide lines or features on the touch screen.

18. A computing device comprising a touch screen displaying a virtual key, in which (a) selection of a virtual key occurs when a user presses down on the screen overlying the virtual key with a force exceeding a first pre-defined force and (b) confirmation that a virtual key is selected occurs when the user presses down on the screen overlying the virtual key with a force exceeding a second pre-defined force, and actuates a switch underlying the touch screen.

19. The device of Claim 18 operable so that actuation of the switch that occurs when the user presses down on a virtual key causes a control signal to be sent from the switch that results in that virtual key being confirmed as selected.

20. The device of Claim 18 operable so that actuation of the switch triggers the immediate capture and use of X-Y co-ordinates of the area that is being pressed down upon, as measured by an ITO touch screen system.

21. The device of Claim 18 in which the switch provides mechanical audio feedback of its actuation.

22. The device of Claim 18 operable to allow 'drag and drop', in which the step of selecting a virtual key to be dragged is achieved when the user presses down on the virtual key with a force exceeding the first pre-defined force but not exceeding the second pre-defined force, the step of dragging is achieved when the user alters the contact point at which he presses down and the step of dropping is achieved when the user lifts off from the screen.

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23. The device of Claim 18 in which 'drag and drop' is possible, in which the step of selecting a virtual key to be dragged is achieved when the user presses down on the virtual key with a force above the second pre-defined force, the step of dragging is achieved when the user alters the contact point at which he presses down and the step of dropping is achieved when the user lifts off from the screen.

24. The device of Claim 18 in which highlighting is possible, in which the step of selecting a virtual key to be highlighted is achieved when the user presses down on the virtual key with a force above the second pre-defined force, the step of marking text to be highlighted is achieved when the user moves the contact point at which he presses down over all of the text to be highlighted and the step of confirming selection is achieved when the user lifts off from the screen.

25. The device of Claim 18 in which the switch is arranged so that the pre-defined force does not vary beyond a pre-defined and limited extent across the entire touch screen.

26. The device of Claim 18 in which several virtual keys are displayed in proximity to one another and any ambiguity in the identify of the key which the user intended to select is resolved by disambiguation software running on the device which relates the likelihood of a given key being the correct key to the proximity of the actual strike area on the touch screen to that of the key.

27. The device of Claim 26 in which virtual keys for all letters of the alphabet are displayed.

28. The device of Claim 27 in which there is no delineation between one or more of the virtual keys.

29. The device of Claim 26 in which a numeric keypad is displayed.

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30. The device of Claim 18 in which the device can display different virtual keys depending on the application being used by the user or the appropriate inputs needed for a given application.

31. The device of Claim 18 which comprises a touch screen layer on the left side of the device to receive input from the left hand and a second touch screen layer on the right side to receive input from the right side.

32. The device of Claim 18 in which the display is a LCD display.

33. The device of Claim 18 in which the display is a backlit electroluminescent display.

34. The device of Claim 33 in which the electroluminescent display comprises several different layers, each layer comprising a different set of virtual keys.

35. The device of Claim 18 which operates such that the step of selection of a key that occurs prior to confirmation of that selection is accompanied by audio, visual and/or tactile feedback.

36. The device of Claim 35 in which the audio feedback is the name of the key generated by a synthetic voice.

37. The device of Claim 35 in which the visual feedback is the identity of the key displayed in a preview window.

38. The device of Claim 35 in which the tactile feedback arises from low profile guide lines or tactile features on the touch screen.

39. The device of Claim 18 comprising a hinged panel that in one position overlies at least part of a display, the hinged panel itself being the screen that the user presses down on and itself comprises a translucent panel through which virtual keys shown on the display are visible.

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40. The device of Claim 39 in which the hinged panel is a flip panel that comprises a microphone.

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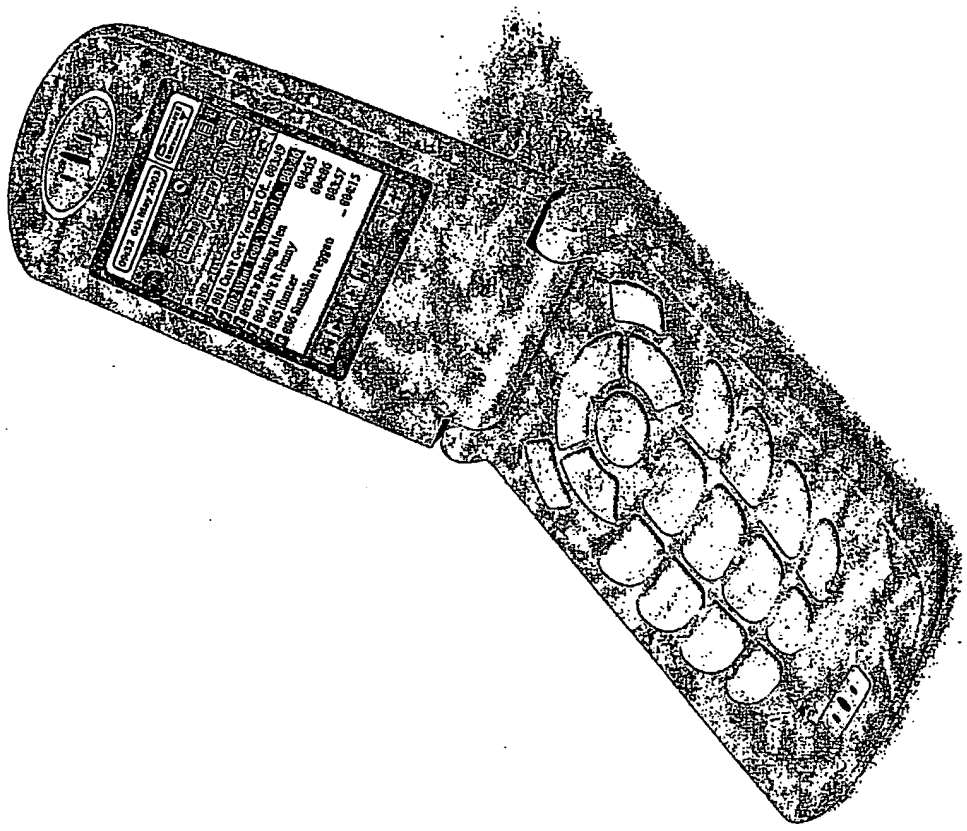


Figure 1

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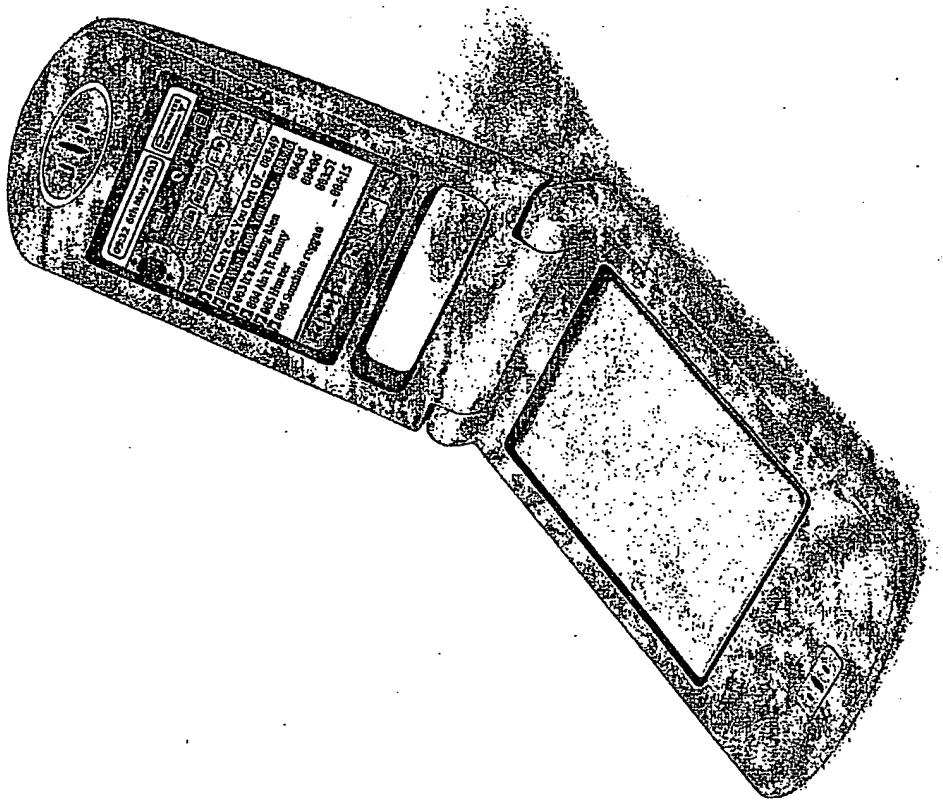


Figure 2

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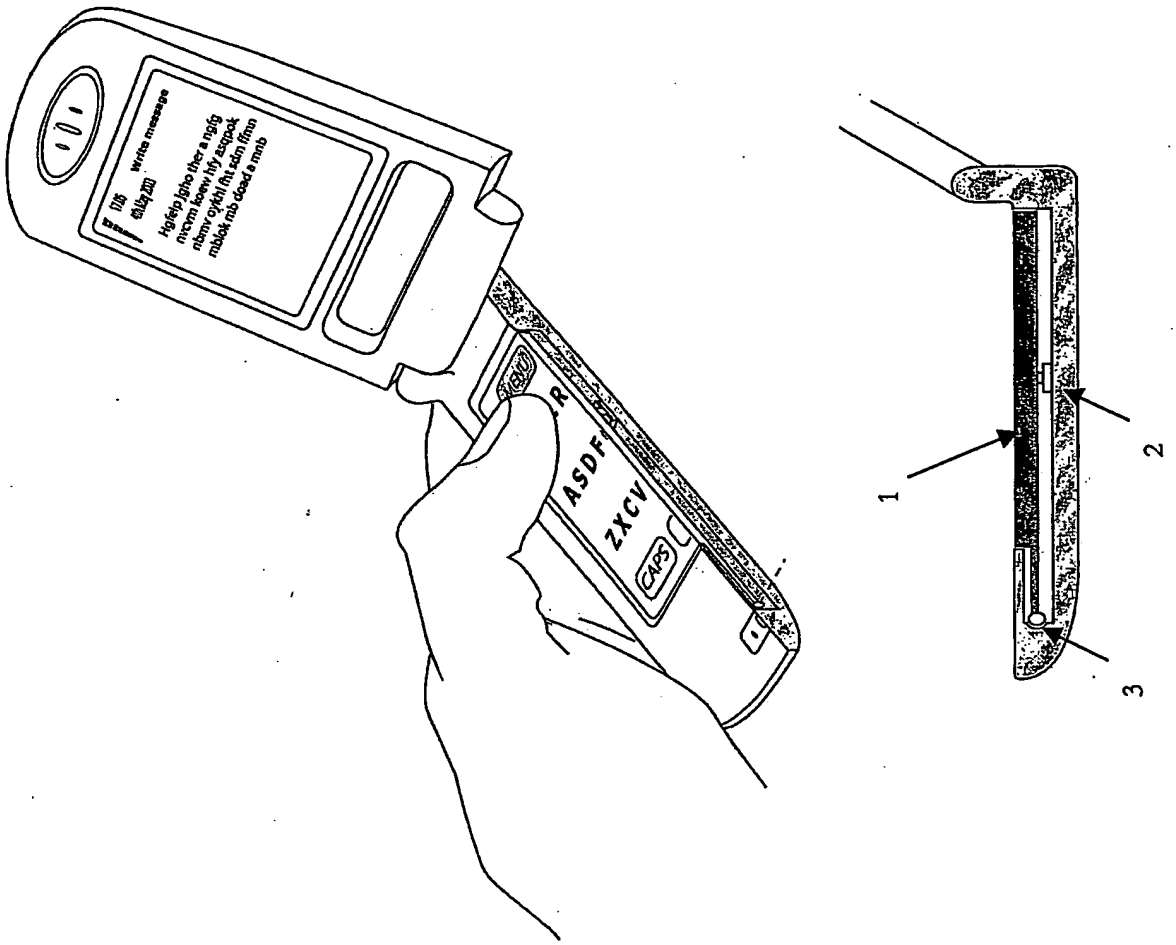


Figure 3

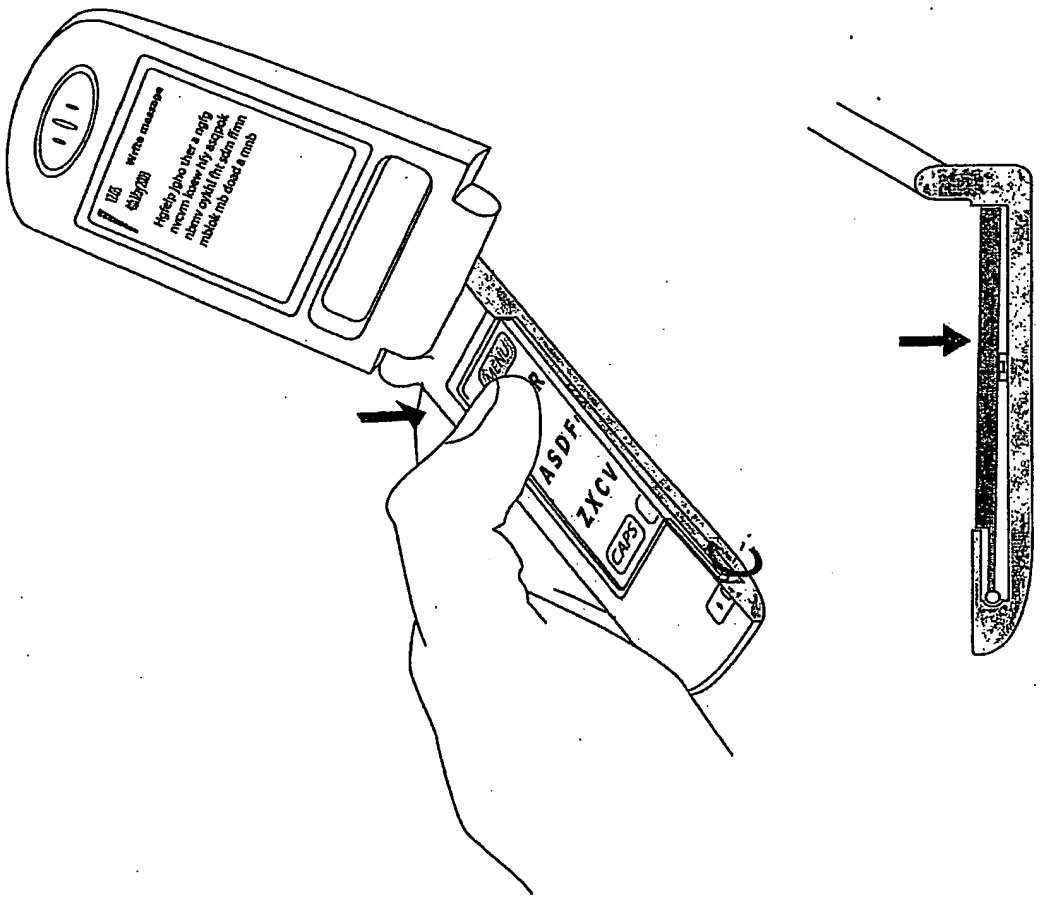


Figure 4

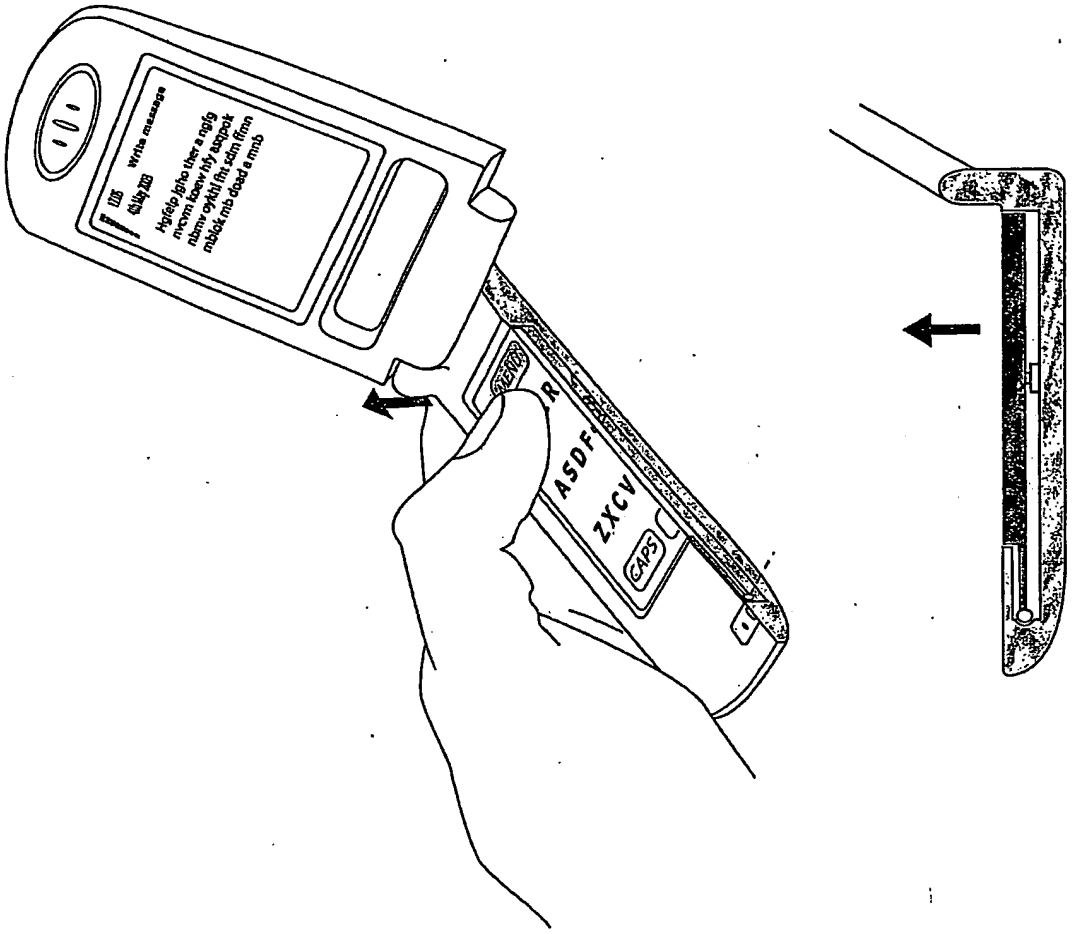


Figure 5

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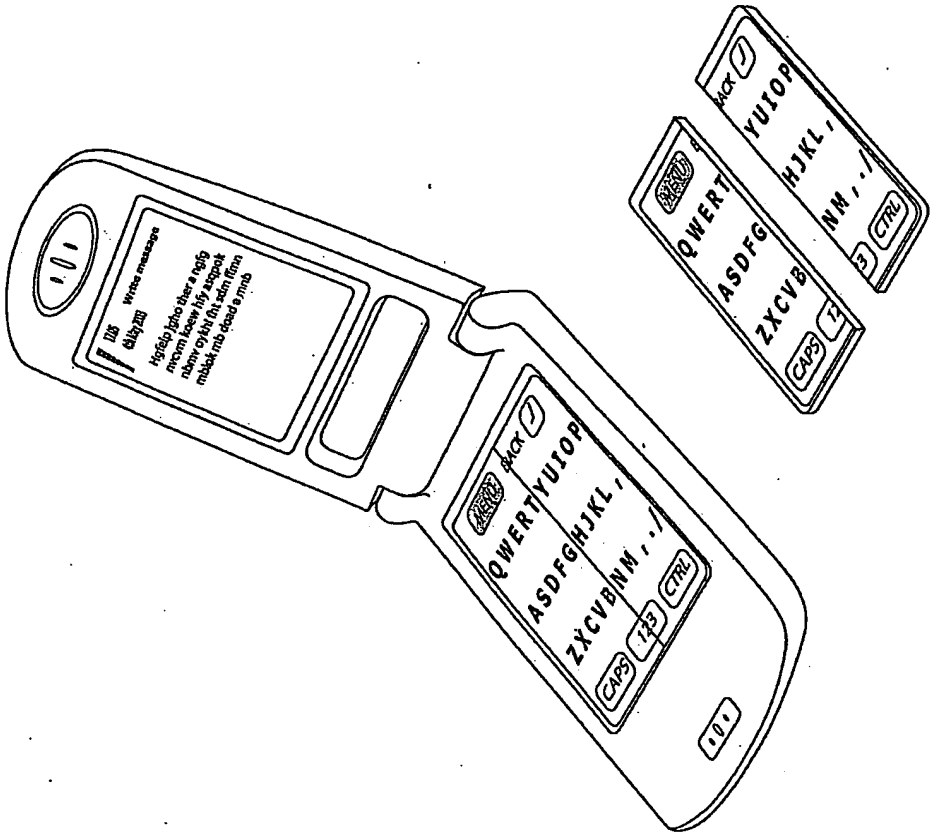


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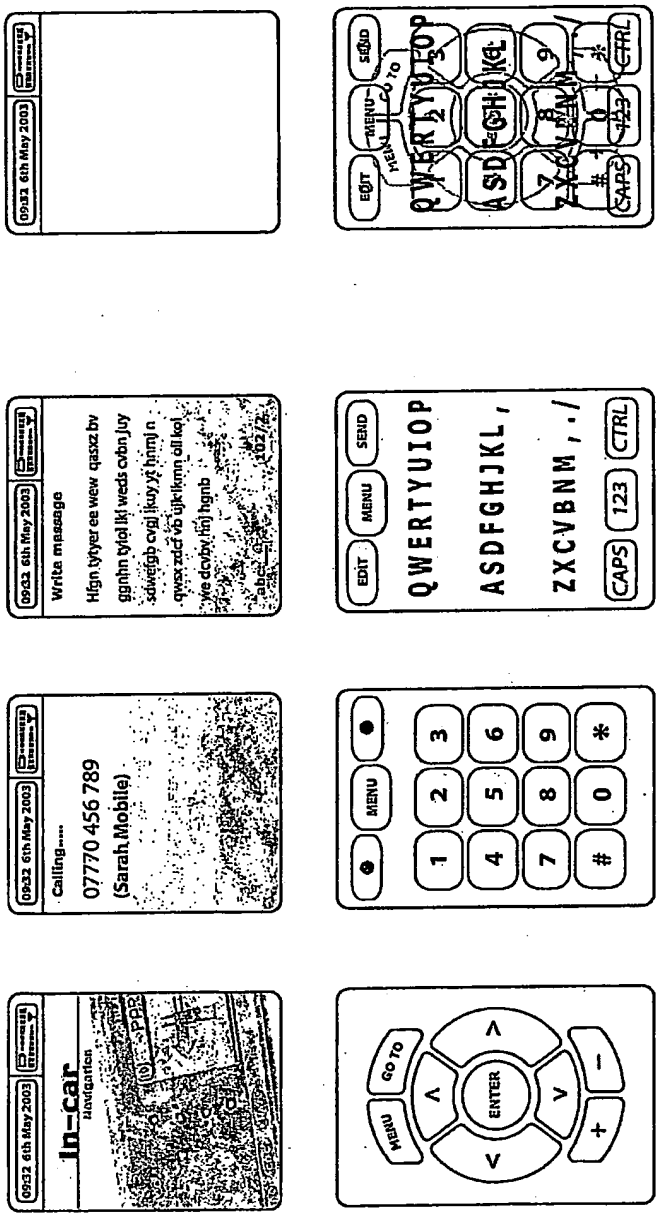
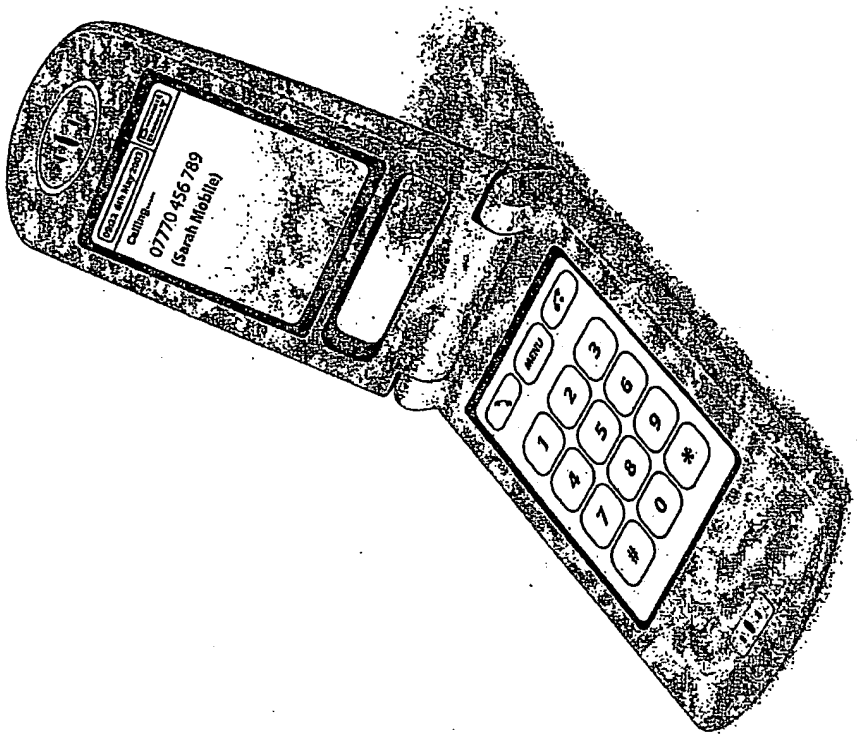
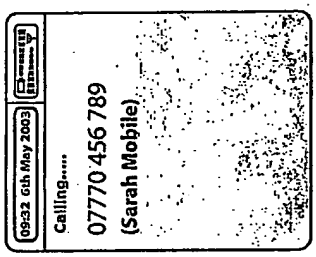


Figure 7

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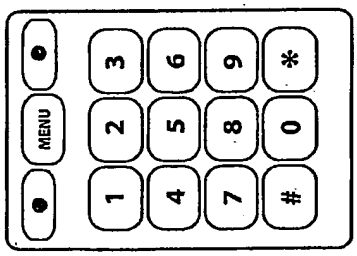


Figure 8

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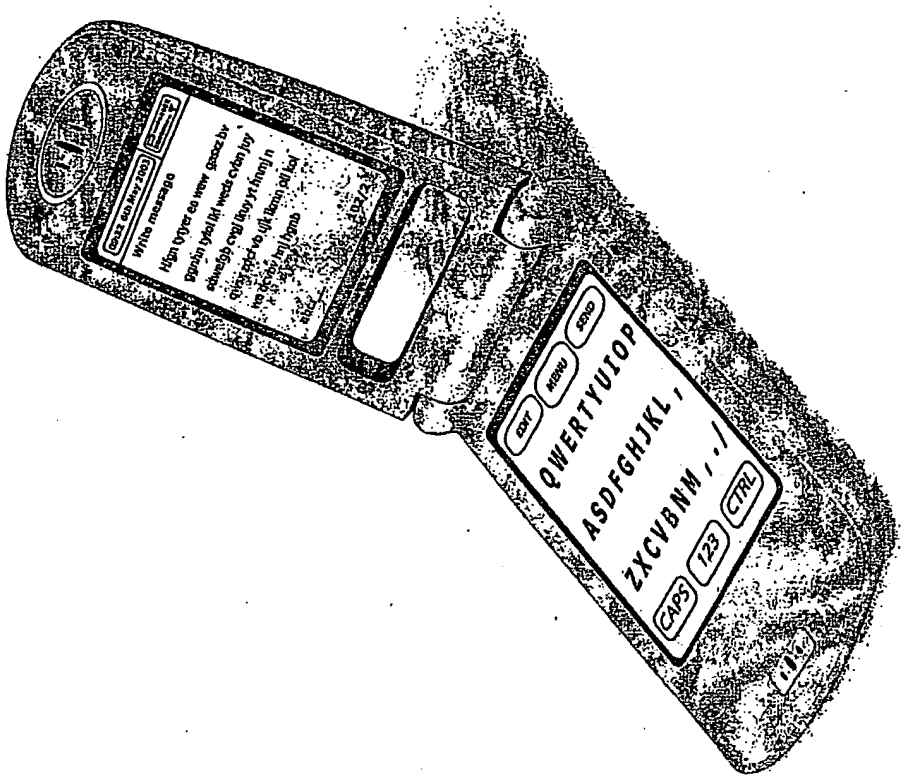


Figure 9

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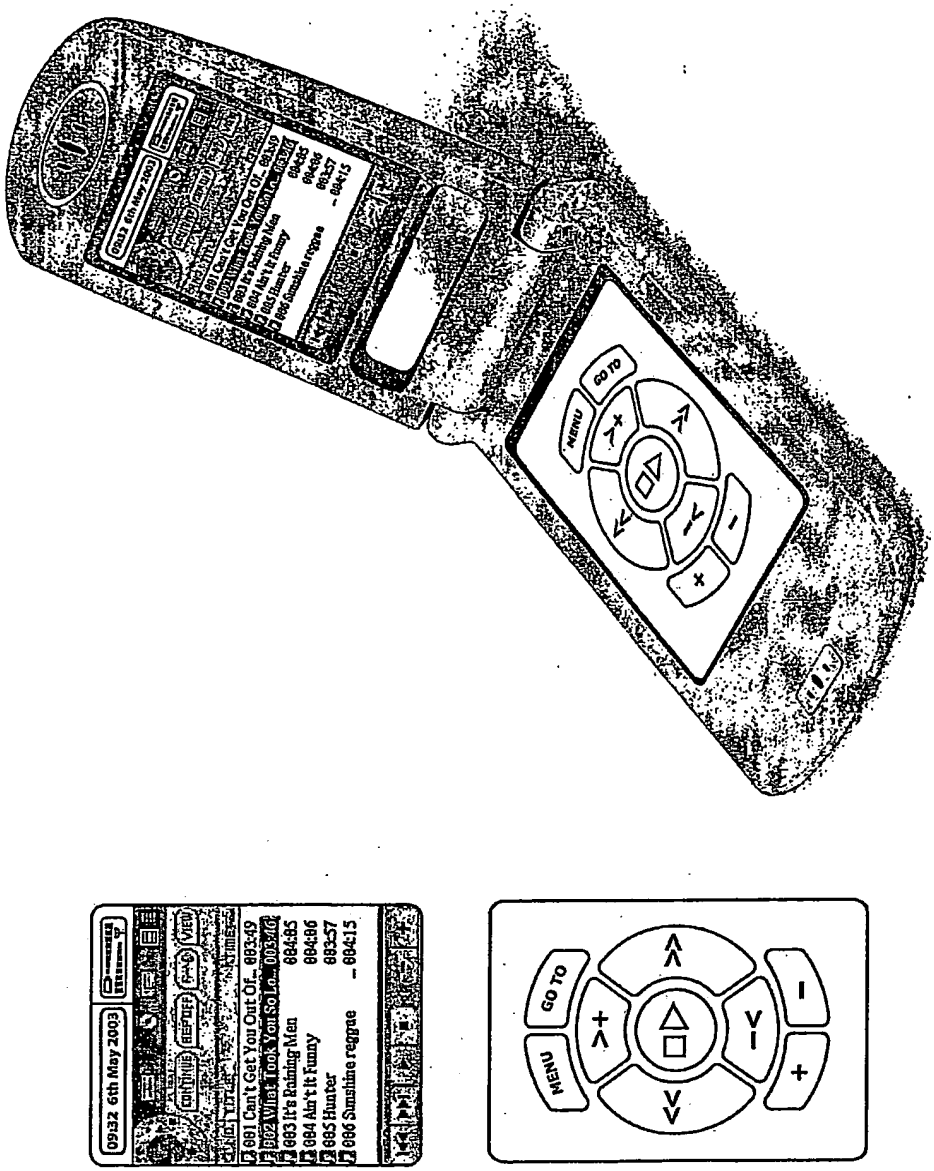


Figure 10

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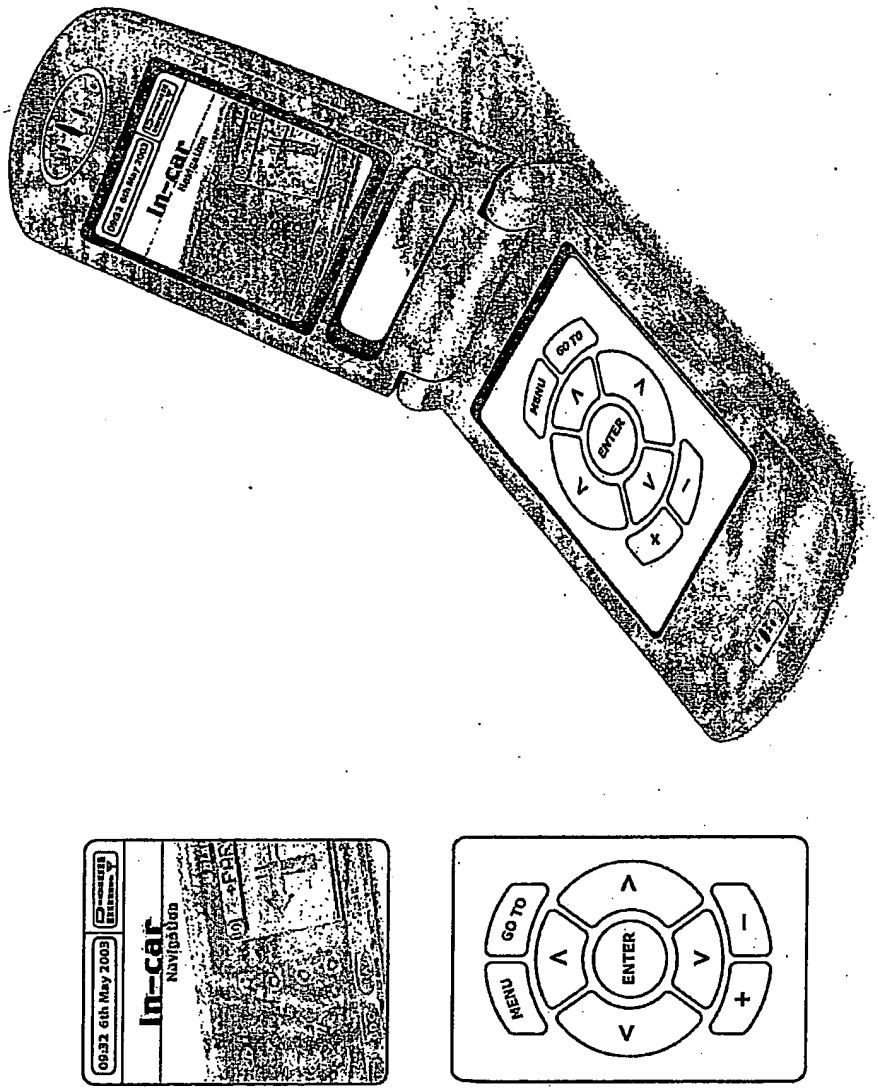
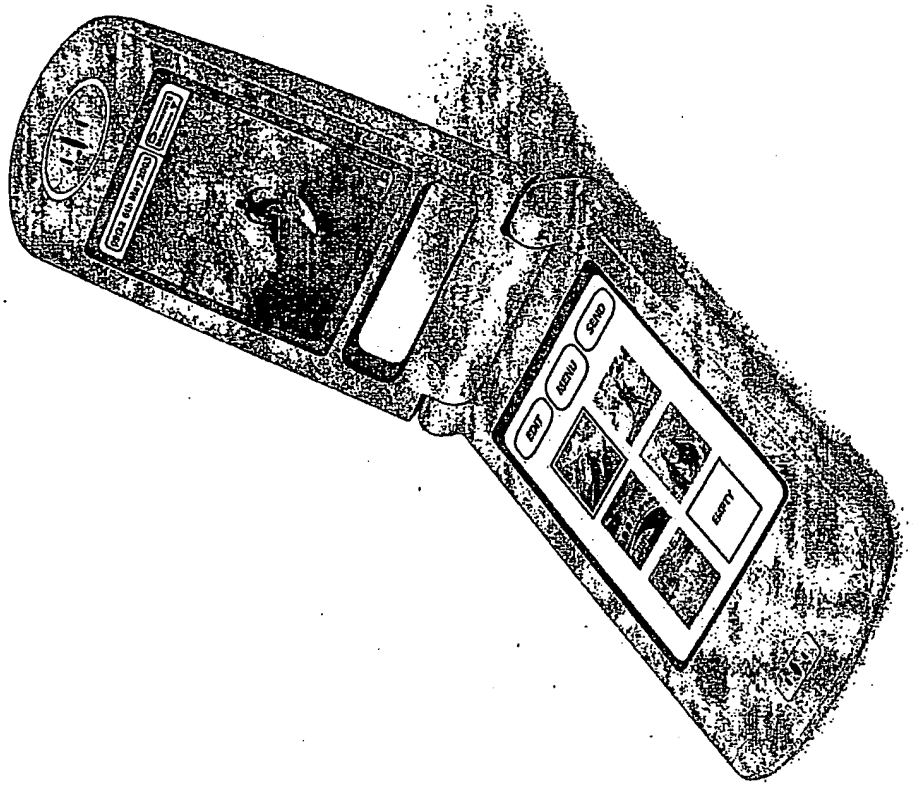


Figure 11

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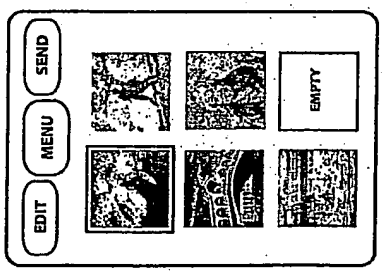


Figure 12

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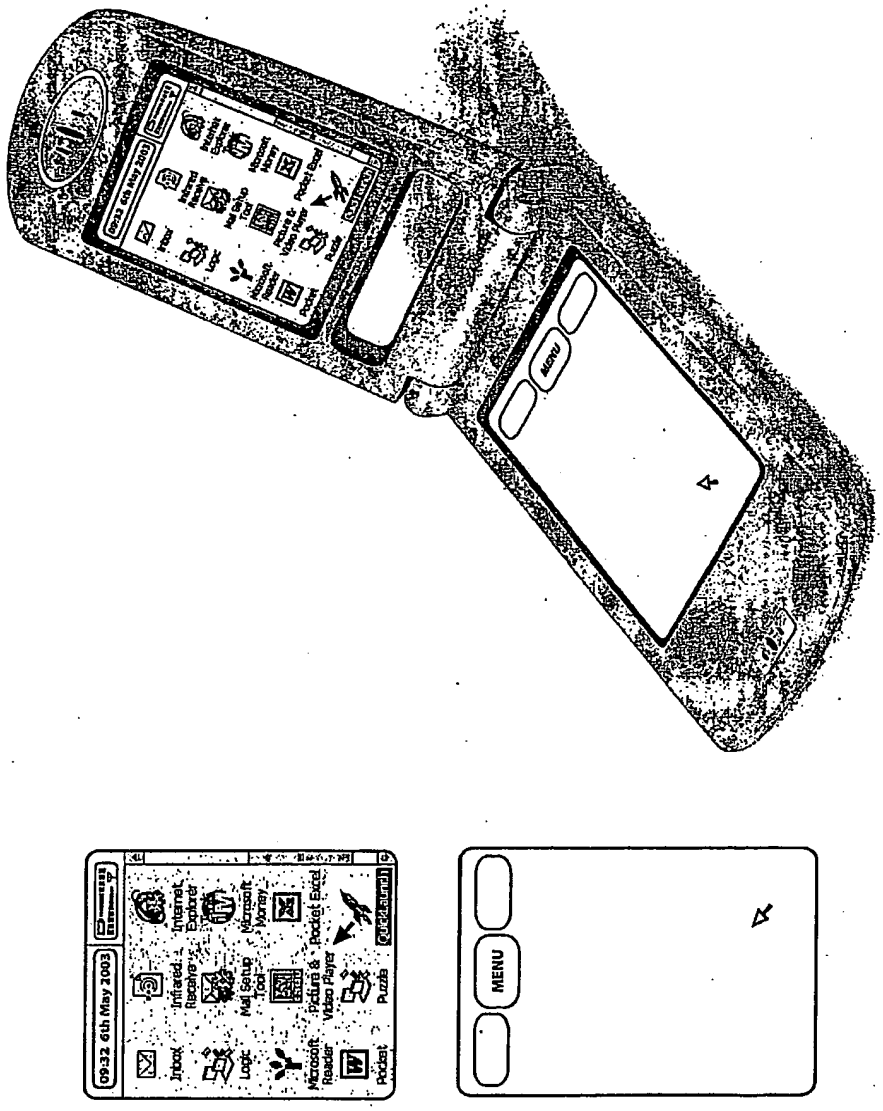

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Figure 13

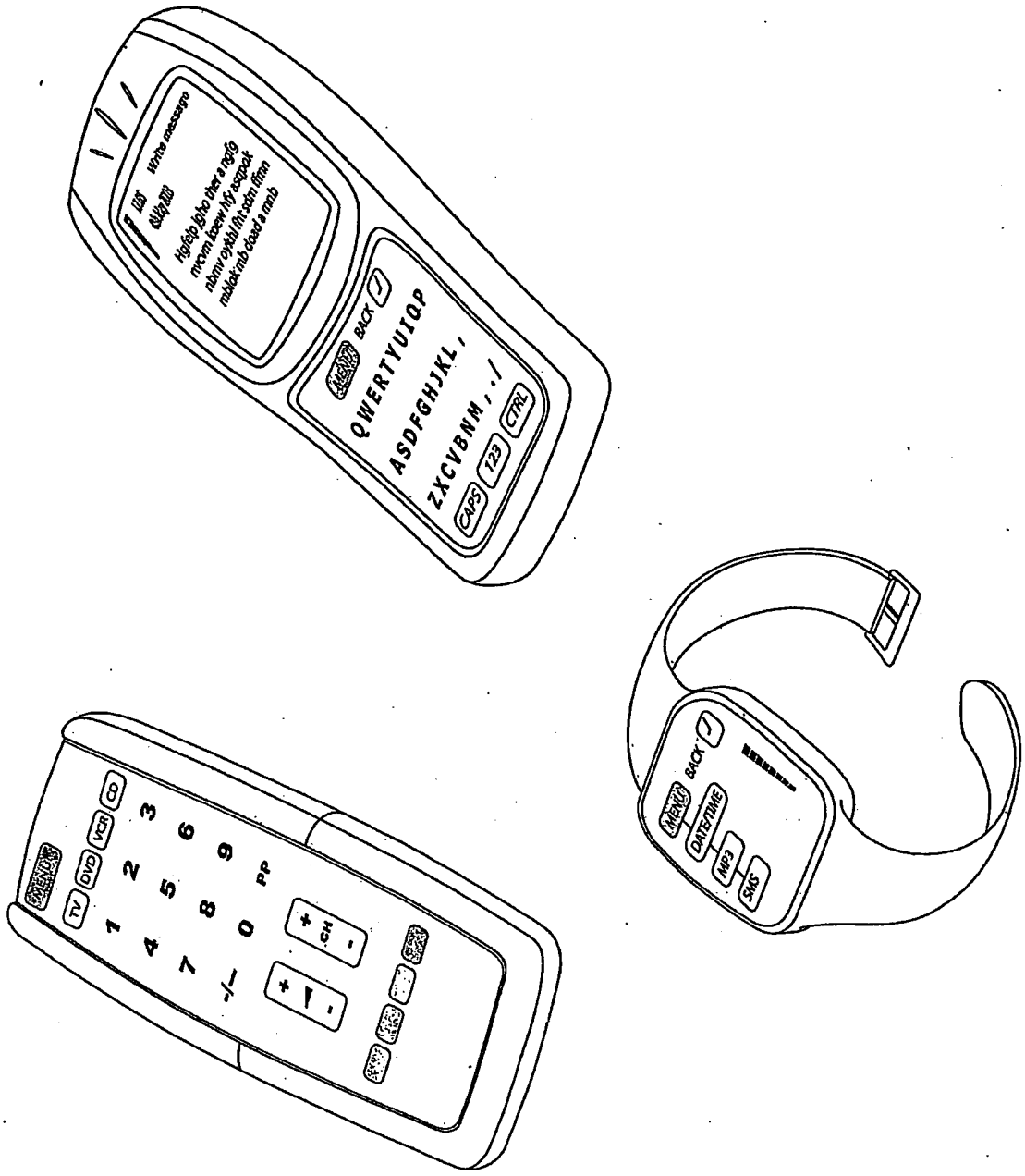


Figure 14

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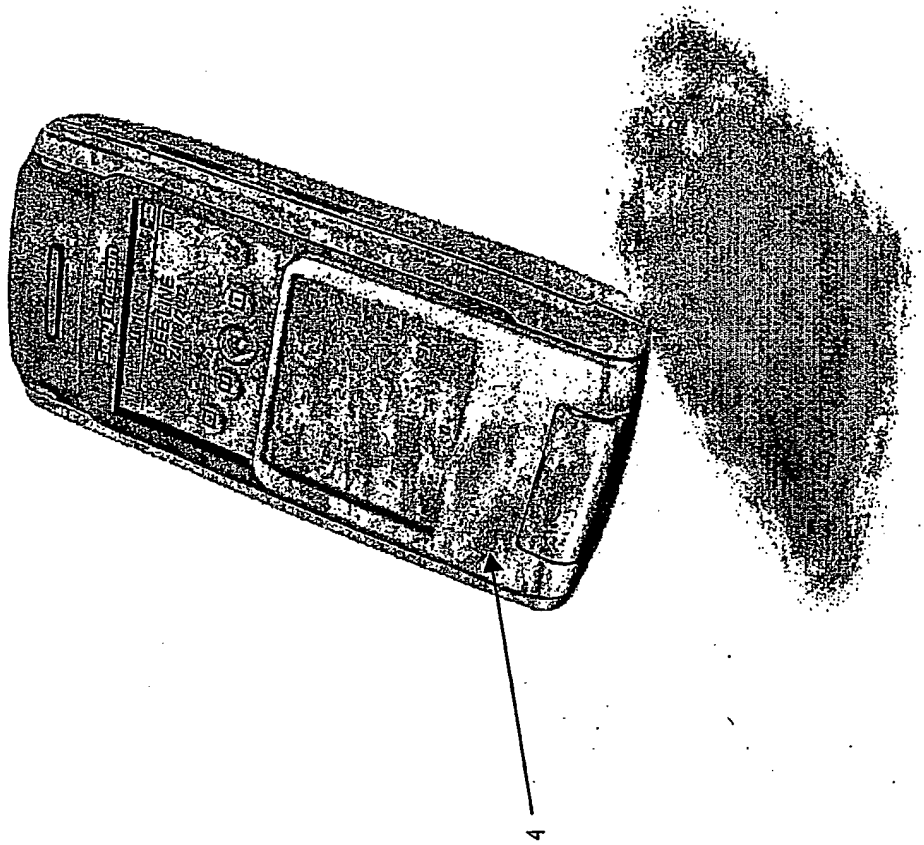


Figure 15

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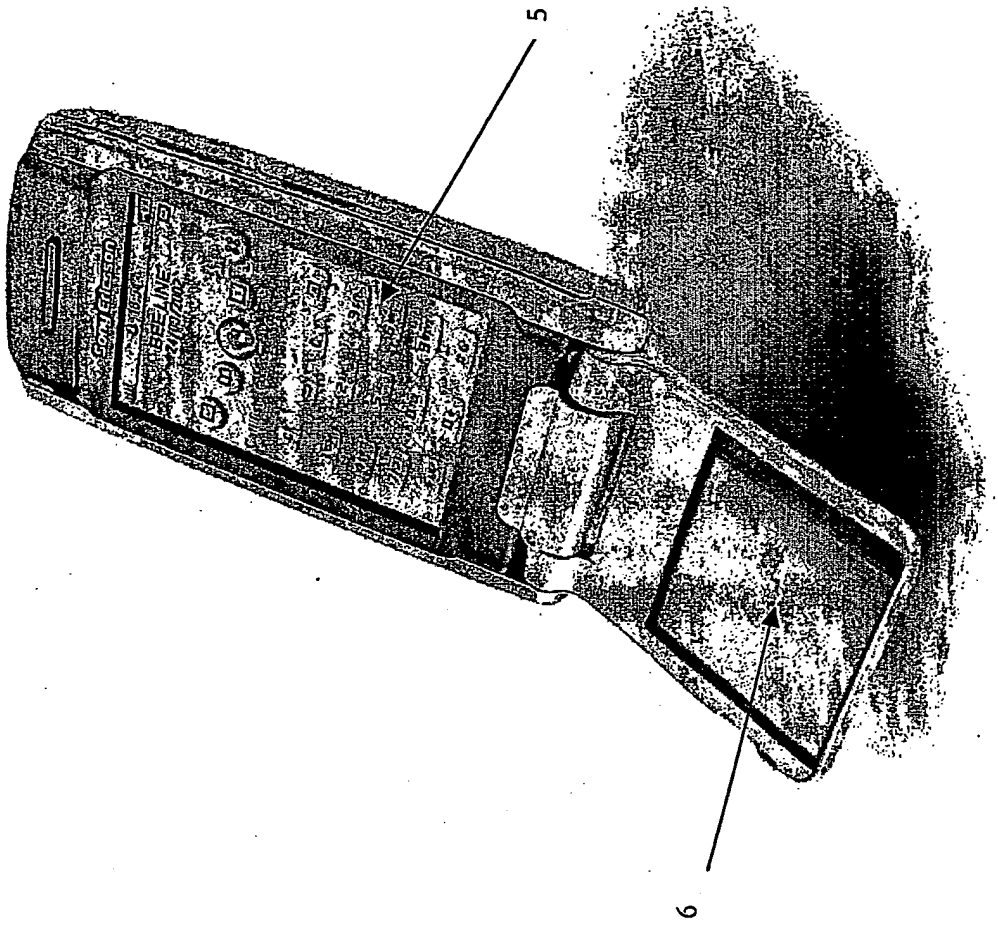


Figure 16

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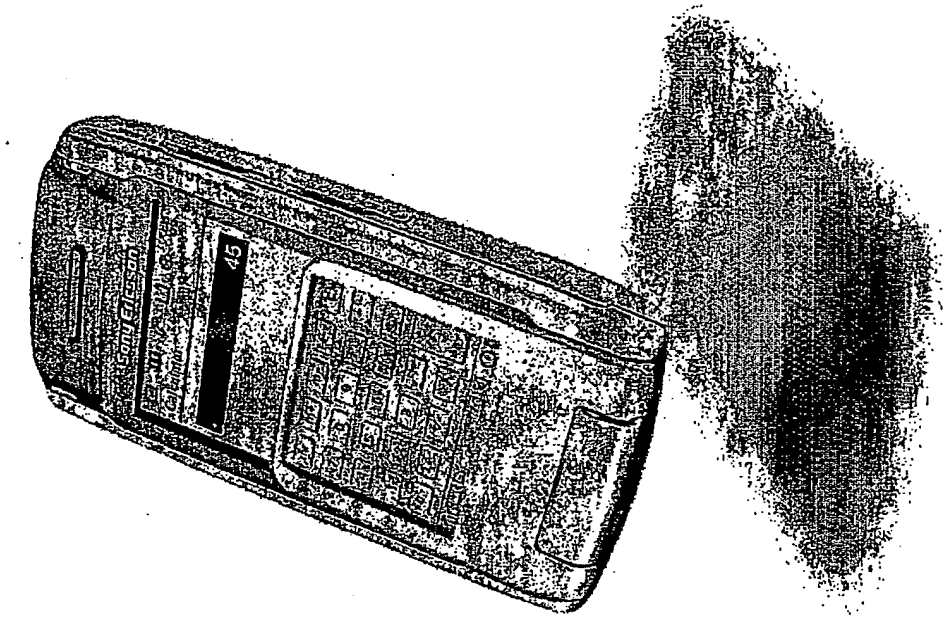


Figure 17

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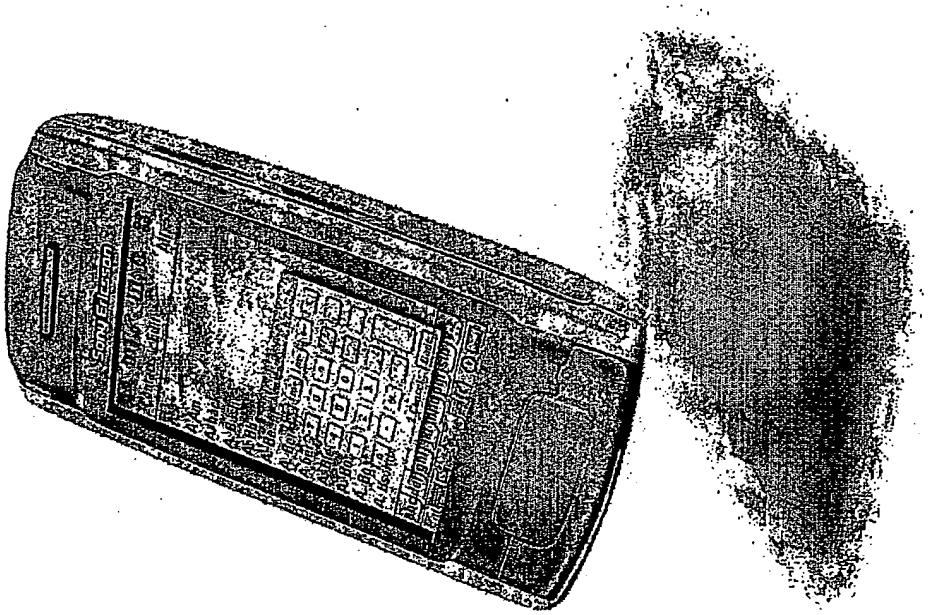


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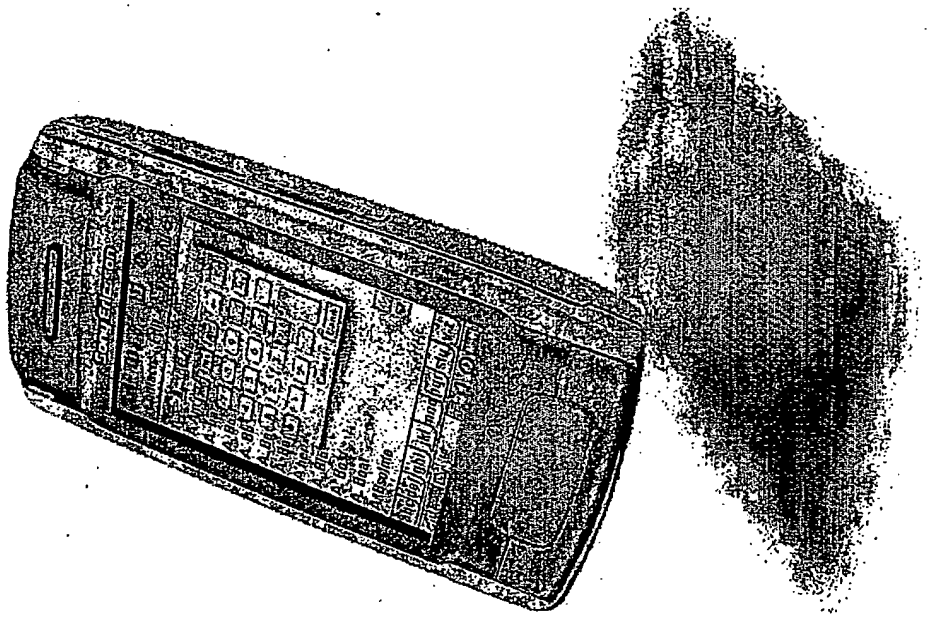


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(71) Applicant: METRO ENGINEERING ASSOCIATES, INC. [US/US]; 330 Whitney Avenue, Holyoke, MA 01040 (US).

(72) Inventor: BENKLEY, Fred, G., III; 120 Wildwood Avenue, Springfield, MA 01118 (US).

(74) Agent: MCCLELLAN, William, R.; Wolf, Greenfield & Sacks, P.C., 600 Atlantic Avenue, Boston, MA 02210 (US).

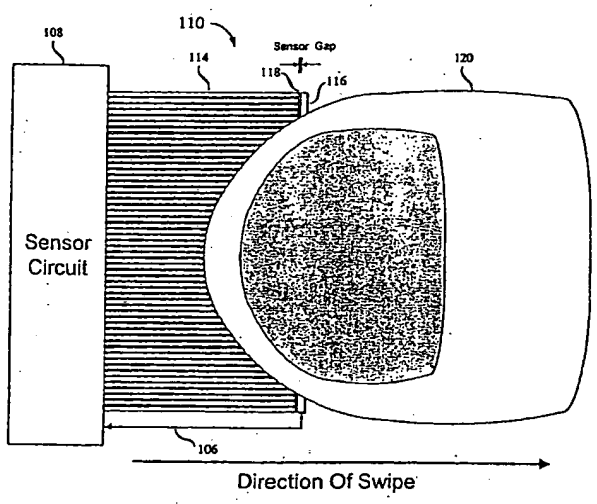
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(54) Title: SWIPED APERTURE CAPACITIVE FINGERPRINT SENSING SYSTEMS AND METHODS



(57) Abstract: A fingerprint sensing system includes an image sensor, a rate sensor and a sensor circuit. The image sensor includes a linear array of capacitive sensors for capacitive sensing of ridge peaks and ridge valleys of a fingerprint on a swiped finger. The rate sensor senses the speed of the finger as it is swiped across the image sensor. The sensor circuit supplies image drive signals to the image sensor ans detects signals in response to the drive signals. The sensor circuit supplies rate drive signals to the rate sensor and detects rate signals in response to the rate drive signals. The sensor circuit further coordinates the image signals and the rate signals to provide a fingerprint image. The image sensor may be configured as an image pickup plate and multiple image drive plates formed on a substrate, such as a flexible printed circuit board or other flexible substrate which may conform to the shape of the finger.

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SWIPED APERTURE CAPACITIVE FINGERPRINT SENSING SYSTEMS AND METHODS

Cross Reference to Related Application

This application claims the benefit of provisional application serial no. 60/251,371, filed December 5, 2000, which is hereby incorporated by reference.

Field of the Invention

This invention relates to systems and methods for electronically sensing topographic features of an object, such as a fingerprint. More particularly, the invention relates to systems and methods for capacitive sensing of a fingerprint on a swiped finger.

Background of the Invention

Electronic fingerprint sensing has received increased attention as a technique for reliable identification of individuals. Electronic fingerprint sensing may be used in stationary equipment, such as security checkpoints, or in portable devices, such as mobile phones and other wireless devices, and smart cards. Accordingly, electronic fingerprint sensing systems are required to be compact, highly reliable and low in cost.

Electronic fingerprint sensing using optical methods is well established. A simple lens-based video camera system is disclosed in U.S. Patent No. 4,525,859 issued June 25, 1985 to Bowles et al. More sophisticated units using holographic elements that project a corrected two-dimensional image onto a CCD imaging device are disclosed in U.S. Patent No. 5,109,427 issued April 28, 1992 to Yang.

More recently, electronic fingerprint sensors incorporating an array of electrodes to create a contour map of finger ridge capacitances have become popular. U.S. Patent No. 4,353,056 issued October 5, 1982 Tsikos discloses a sensor that has a two-dimensional row and column array of capacitors, each including a pair of spaced electrodes with sensing electronics, all overlaid with an insulating film. The sensor relies on the finger ridges to deform a pattern in the insulating film, thereby changing the underlying capacitance detected by the electrode array. This approach, however, requires extraordinary resiliency and durability in the polymer insulating film, which is difficult to achieve.

A more direct approach is disclosed in U.S. Patent No. 5,325,442 issued June 28, 1994 to Knapp, which discloses a two-dimensional electrode array that forms capacitors

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between each electrode on the substrate and a grounded finger that is placed in close proximity to the electrode. Thin film transistors located on an insulator are configured as switching elements to scan each row and column in the array. Additional circuitry measures the charging currents for each capacitor in the array as they are scanned, from which the individual capacitances are determined. These values are then used to create a two-dimensional capacitance map of the finger ridge patterns, which closely resembles the physical structure of the finger.

U.S. Patent No. 6,016,355 issued January 18, 2000 to Dickinson et al also proposes a two-dimensional matrix of electrodes on a substrate. The electrodes form an array of capacitors to a grounded finger in close proximity. This approach determines the amount of capacitance by placing a fixed voltage on each capacitor in the array and then measuring the time to discharge the capacitor with a constant current source in parallel.

All of the two-dimensional capacitive array approaches have disadvantages. First is the large number of transistor devices that are required to scan and measure the more than ten thousand capacitors in such an array at a 100 micron pitch. Even if the die area could be reduced by smaller device geometries, a large die size of at least 10mm on a side is required to obtain sufficient contact area. Second is the problem of electrostatic discharge from a charged human body through the finger, breaking down the thin insulator that separates the finger from the sensitive electrodes and destroying the low voltage transistors that operate the array. A third problem is the risk of mechanical damage that is posed by direct physical contact of the finger to an exposed silicon die.

A fingerprint optical input apparatus including a contact image sensor for viewing a moving finger and providing an image is disclosed in U.S. Patent No. 6,259,108 issued July 10, 2001 to Antonelli et al. A linear sensor imaging method and apparatus for capturing an image of an object which moves, at an unknown variable or constant speed, past one or more linear sensor arrays is disclosed in U.S. Patent No. 6,002,815 issued December 14, 1999 Immega et al.

All of the known prior art electronic fingerprint sensing systems have had one or more disadvantages, including low reliability and high cost. Accordingly, there is a need for new and improved electronic fingerprint sensing systems and methods.

Summary of the Invention

In accordance with an aspect of the invention, conductive elements, or plates, are formed on an insulating substrate to create a one-dimensional capacitive sensing array for detecting topographic variations in an object, such as a finger. The array includes multiple drive plates which are sequentially excited with short duration electronic waveform bursts. An orthogonal pickup plate connected to a charge sensing circuit sequentially detects the intensity of the electric field created by each drive element. With each complete scan of the drive plates, a one-dimensional slice of the relative dielectric constant of the object is acquired. By swiping an object such as a finger across the gap between the drive plates and the pickup plate, and scanning the gap at a much faster rate than the swipe speed, a two-dimensional image based on capacitance is generated. The image closely resembles the object's physical surface features.

According to an aspect of the invention, image sensing apparatus is provided. The image sensing apparatus comprises at least one image pickup plate disposed generally laterally with respect to a direction of movement of an object, and a plurality of image drive plates in spaced relation to the image pickup plate to define a plurality of sensor gaps. Features of the object passing over the sensor gaps produce a change in capacitance between respective image drive plates and the image pickup plate.

In some embodiments, the image pickup plate and the image drive plates are dimensioned and spaced for sensing a fingerprint. In these embodiments, the spacing between each of the image drive plates and the image pickup plate is preferably less than about one-half of the ridge spacing on a typical fingerprint, and the spacing between adjacent image drive plates is preferably less than about one-half of the ridge spacing on a typical fingerprint. In some embodiments, the image drive plates comprise parallel conductors disposed perpendicular to the image pickup plate and spaced from the image pickup plate by respective sensor gaps. In some embodiments, two or more image pickup plates are utilized, and a corresponding number of drive plates are energized simultaneously. Preferably, the image pickup plate and the image drive plates are substantially coplanar. Features of the finger passing above the sensor gaps produce changes in capacitance between respective image drive plates and the image pickup plate..

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The image pickup plate and the image drive plates may comprise conductive traces on a substrate. The substrate may comprise a printed circuit board. In another embodiment, the substrate comprises a flexible substrate. The apparatus may further comprise a substrate support having a contour selected to substantially match the contour of a typical finger. The flexible substrate may be affixed to the contoured substrate support, so that the image sensor matches the shape of the finger.

The image sensing apparatus may further comprise an excitation circuit for sequentially energizing the image drive plates with image drive signals and a detection circuit for detecting the drive signals capacitively coupled from the image drive plates to the image pickup plate to provide image signals. The image drive signals may comprise sequential signal bursts supplied to respective ones of the image drive plates. The excitation circuit may include circuitry for coupling inactive image drive plates to a reference potential. The detection circuit may comprise a synchronous envelope detector for providing pulses in response to the detected signal bursts. The image sensing apparatus may further comprise and analog-to-digital converter for converting the pulses to digital values, a memory and a processor for storing the digital values in the memory. The processor may initiate a plurality of sequential line scans of the image drive plates to provide a plurality of line scans along lines of the moving object.

According to a further aspect of the invention, rate sensing apparatus is provided. The rate sensing apparatus comprises two or more object detectors spaced apart along a direction of movement of an object, each of the object detectors including at least one rate drive plate and at least one rate pickup plate. An end of an object passing over each of the object detectors produces a change in capacitance between respective rate drive plates and rate pickup plates.

Preferably, the rate drive plate and the rate pickup plate of each of the object detectors are disposed generally laterally with respect to the direction of movement of the object. In some embodiments, each of the object detectors includes first and second rate pickup plates disposed on opposite sides of the rate drive plate to form a differential rate sensor.

The rate drive plates and the rate pickup plates of the object detectors may be dimensioned and spaced for detecting the speed of a moving finger. The rate drive plates and the rate pickup plates may be curved to substantially match the curve of a typical

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finger end. Preferably, the rate drive plates and the rate pickup plates of the object detectors are substantially coplanar.

The rate drive plates and the rate pickup plates may comprise conductive traces on a substrate, such a printed circuit board. In a preferred embodiment, the substrate comprises a flexible substrate that may be contoured to match the contour of a typical finger.

The rate sensing apparatus may further comprise an excitation circuit for energizing the rate drive plates of the object detectors with rate drive signals and a detection circuit for detecting the drive signals capacitively coupled from the rate drive plate to the rate pickup plate of each of the object detectors to provide rate signals. The rate drive signals may comprise signal bursts. The detection circuit may comprise a synchronous envelope detector. The rate sensing apparatus may further comprise a processing circuit for determining a time delay between the rate signals from the object detectors. The time delay between the rate signals is representative of the speed of the object.

According to another aspect of the invention, a fingerprint sensing system is provided. The fingerprint sensing system comprises an image sensor including a linear array of capacitive sensors for capacitive sensing of ridge peaks and ridge valleys of a fingerprint on a moving finger, a rate sensor for sensing the speed of the finger as it moves across the image sensor, and a sensor circuit for excitation of the image sensor with image drive signals and for detection of image signals in response to the image drive signals, for excitation of the rate sensor with rate drive signals and for detection of rate signals in response to the rate drive signals, and for coordinating the image signals and the rate signals to provide a fingerprint image.

The image sensor may comprise at least one image pickup plate disposed generally laterally with respect to a direction of movement of the finger and a plurality of image drive plates in spaced relation to the image pickup to define a plurality of sensor gaps. Ridge peaks and ridge valleys of the fingerprint passing over the sensor gaps produce changes in capacitance between respective image drive plates and the image pickup plate.

The rate sensor may comprise two or more finger detectors spaced apart along the direction of movement of the finger. Each of the finger detectors may include at least

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one rate drive plate and at least one rate pickup plate. An end of the finger passing over each of the finger detectors produces a change in capacitance between respective rate drive plates and rate pickup plates. The sensor circuit may include a processing circuit for detecting a time delay between rate signals from the finger detectors. The time delay between the rate signals is representative of the speed of the finger.

The image sensor and the rate sensor may be fabricated on a substrate. In some embodiments, the substrate comprises a flexible substrate. In other embodiments, the sensor circuit is fabricated on the substrate with the image sensor and the rate sensor.

According to a further aspect of the invention, a capacitive sensor is provided. The capacitive sensor comprises at least one pickup plate and a plurality of drive plates in spaced relation to the pickup plate. The pickup plate and the plurality of drive plates are substantially coplanar. An object passing above the array of sensor gaps produces a change in capacitance between respective drive plates and the pickup plate.

Brief Description Of The Drawings

For a better understanding of the invention, reference is made to the accompanying drawings, which are incorporated herein by reference and in which:

Fig. 1A is a block diagram of an image sensing system in accordance with an embodiment of the present invention;

Fig. 1B illustrates an embodiment of the present invention, showing a finger being swiped across a fingerprint image sensor;

Fig. 2A shows a possible electric field distribution when a ridge peak of a fingerprint is being sensed according to an embodiment of the present invention;

Fig. 2B shows the electric field distribution when a ridge valley of the fingerprint is being sensed according to an embodiment of the present invention;

Fig. 3 is a block diagram of an image sensing circuit according to an embodiment of the present invention;

Fig. 4 is a schematic diagram of an embodiment of an image sensor, illustrating parasitic field lines that may be encountered during operation of the present invention;

Fig. 5 illustrates an embodiment of an image sensor wherein the substrate is flexible;

Fig. 6 illustrates an image sensor according to an embodiment of the present invention;

Fig. 7 illustrates an image sensor according to another embodiment of the present invention;

Fig. 8 illustrates an image sensor according to yet another embodiment of the present invention;

Fig. 9 illustrates a rate sensor according to an embodiment of the present invention;

Fig. 10 illustrates a rate sensor according to another embodiment of the present invention;

Fig. 11 illustrates a rate sensor according to yet another embodiment of the present invention;

Fig. 12 shows a rate sensor according to a further embodiment of the present invention;

Fig. 13 shows a rate sensor according to another embodiment of the present invention;

Fig. 14 shows a rate sensor according to yet another embodiment of the present invention;

Fig. 15 is a block diagram of a rate sensing circuit according to an embodiment of the present invention;

Fig. 16 is a block diagram of a rate sensing circuit according to another embodiment of the present invention;

Fig. 17 is a block diagram of a rate sensing circuit according to yet another embodiment of the present invention;

Fig. 18 is a block diagram of a data acquisition and control processor in accordance with an embodiment of the present invention;

Fig. 19 is a flow chart of a rate sensing algorithm according to an embodiment of the present invention;

Fig. 20 is a flow chart of a rate sensing algorithm according to another embodiment of the present invention;

Fig. 21 is a flow chart of a rate sensing algorithm according to yet another embodiment of the present invention;

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Fig. 22 is a flow chart of an image line acquisition algorithm according to an embodiment of the present invention;

Fig. 23 is a flow chart of an image acquisition algorithm according to an embodiment of the present invention; and

Fig. 24 is a flow chart of an image acquisition algorithm according to another embodiment of the present invention.

Detailed Description

Methods and apparatus for detecting topographic variations of an object are described herein. In one aspect of the invention, a sensor having a sensor gap, or sensor aperture, is provided. The object being sensed is swiped over the sensor. As topographic variations in the object pass over the sensor aperture, the capacitance of the aperture changes. The capacitance variations are measured. In some embodiments, the capacitance variations are stored in a computer- readable medium. The medium can later be read, the changes in capacitance can be interpreted, and an image of the topographic variations in the object can be reconstructed.

In the practice of swiped aperture sensing, an issue typically encountered is the unknown rate at which the object is swiped. This can produce distorted images. Advantageously, an embodiment of the present invention provides a rate sensor for detecting swipe speed. In embodiments of the present invention, the image is adjusted according to the sensed swipe speed.

In important embodiments, the object being sensed is a finger, and the topographic variations are ridge peaks and ridge valleys of a fingerprint. In these embodiments, the invention is implemented as a fingerprint sensing system. It should be appreciated that, while the invention is described in terms of fingerprint sensing, the invention may be adapted to detect topographic variations in other objects, and should not be considered as limited in this regard.

For ease of description, several illustrative examples are described herein in relation to the drawings. These are examples only, and are not intended to be limiting. A person of skill in the art with the benefit of this application may develop variations intended to be within the scope and spirit of this application. Throughout the drawings, like elements are indicated with like reference numerals.

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Fig. 1A shows a fingerprint sensing system 100 in accordance with an embodiment of the present invention. A sensor block 102 receives drive signals from and delivers sensed signals to a sensor circuit 108. Sensor block 102 includes an image sensor 110 and a rate sensor 112. Sensor circuit 108 includes an image sensing circuit 124, a rate sensing circuit 122 and a microprocessor and memory 130. Image sensor 110 receives drive signals 104 from and delivers sensed signals 106 to image sensing circuit 124. Rate sensor 112 receives drive signals 105 from and delivers sensed signals 107 to rate sensing circuit 122. Microprocessor and memory 130 acquires and processes image data and rate data and controls the operation of the system. The components of system 100 are described in detail below.

Fig. 1B shows the practice of an embodiment of the present invention. In the embodiment shown in Fig. 1B, image sensor 110 includes multiple drive plates 114 and a pickup plate 116. Drive plates 114 are arranged substantially parallel to each other and are connected to sensor circuit 108. Pickup plate 116 is disposed substantially perpendicular to drive plates 114 and is separated from drive plates 114 by a sensor gap 118. More particularly, sensor gap 118 includes multiple sensor gaps between respective drive plates 114 and pickup plate 116. Image sensor 110 thus includes a linear array of sensor gaps.

Operation of the embodiment of Fig. 1B is now described. In Fig. 1B, a finger 120 is moved, or swiped, perpendicular to sensor gap 118. Sensor circuit 108 sequentially energizes drive plates 114 with drive signals. As ridge peaks and ridge valleys of the fingerprint on finger 120 pass over sensor gap 118, the drive signals applied to drive plates 114 are capacitively coupled to pickup plate 116 according to the capacitances of the individual sensor gaps. As described below, the capacitance varies in accordance with the ridge peaks and ridge valleys of the fingerprint passing over the sensor gaps. While a direction of swipe from left to right is indicated in Fig. 1B, it should be appreciated that a direction of swipe from right to left may also be utilized.

Fig. 2A illustrates the capacitive coupling between drive plate 114 and pickup plate 116 when a ridge peak 202 of finger 120 is within the sensor gap 118. Drive plates 114 and pickup plate 116 are affixed to an insulating substrate 206. Primary electric field lines 204 pass substantially through ridge peak 202 from drive plate 114 to pickup plate 116. Secondary field lines also pass through the body of finger 120. Fig. 2A also

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shows parasitic field lines that pass through substrate 206 and horizontally across gap 118.

Fig. 2B illustrates the capacitive coupling between drive plate 114 and pickup plate 116 when a ridge valley 208 of finger 120 is within sensor gap 118. As only the outer field lines of primary electric field lines 204 pass through finger 120 and many primary field lines pass through the air gap, the signal measured in this case is affected by both the bulk capacitance of the finger and the residual parasitic capacitance. The residual parasitic capacitance is the result of substrate field lines 210 passing from drive plate 114 to pickup plate 116 through substrate 206. Advantageously, an embodiment of the present invention may measure the residual parasitic capacitance prior to swiping of finger 120. That measurement is used as a correction to the value measured during fingerprint sensing.

As further shown in Figs. 2A and 2B, drive plate 114 and pickup plate 116 have a substantially coplanar configuration on substrate 206. A thickness, h, of drive plate 114 and pickup plate 116 is typically very small in comparison with the length of each plate. Furthermore, the spacing between drive plate 114 and pickup plate 116 may be on the order of 25 to 50 micrometers for fingerprint sensing. Thus, drive plate 114 and pickup plate 116 constitute side-by-side coplanar electrodes of a capacitive sensor. The primary field lines 204 in the near field above the sensor gap constitute the primary sensing area. It will be understood that a swiped finger results in fingerprint ridges passing above the sensor gap rather than filling the sensor gap between drive plate 114 and pickup plate 116. Thus, the image sensor 110 advantageously operates as a capacitive sensor having substantially coplanar plates which sense fingerprint ridges and valleys passing above the sensor gap between drive plate 114 and pickup plate 116.

The image sensor 110 is one embodiment of a capacitive sensor having a pickup plate and a plurality of drive plates which are substantially coplanar. The capacitive sensor may be used in a variety of sensing applications. In one embodiment, the capacitive sensor is used for position sensing and/or dimension sensing of an object. Thus, an object positioned over the sensor may cover some sensor gaps and not others. As a result, the output signals of the sensor indicate the position and size of the object.

The dielectric constant of a finger is typically 10-20 times greater than the dielectric constant of the surrounding air. Dielectric constants of finger ridges vary from

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finger to finger and person to person; hence the wide range of dielectric constants. Since finger 120 has a dielectric constant that differs substantially from the dielectric constant of air, the capacitance between drive plate 114 and pickup plate 116 varies depending on whether a ridge peak or a ridge valley is passing over sensor gap 118. As a result, the drive signal capacitively coupled from drive plate 114 to pickup plate varies in response to the fingerprint features passing over sensor gap 118. These signal variations are used to generate an electronic image of the fingerprint.

An embodiment of sensor circuit 108 is shown in Fig. 3. In particular, image sensing circuit 124 and microprocessor and memory 130 of Fig. 1A are shown in more detail. A master clock 302 provides a clock signal to mux scanning logic 304 and mixer 306. Master clock 302 can operate over a range of frequencies, for example, 20 MHz-80 MHz, but is not limited to this range. Microprocessor and memory 130 generate control signals for mux scanning logic 304. Outputs of mux scanning logic 304 serve as control inputs to switches 310.

The clock signal from master clock 302 is gated by switches 310 to provide signal bursts 312. A low impedance buffer 314 activates each drive plate 114 with signal burst 312. The signal bursts 312 are generated by standard circuit elements known to those skilled in the art and are derived from a common frequency reference of master clock 302 signal.

Mux scanning logic 304 may sequentially activate switches 310 to scan the drive plates 114. In one embodiment, master clock 302 operates at 40 MHz, and each switch 310 is gated on for about 2-5 microseconds. The sequential signal bursts 312 applied to drive plates 114 provide a linear scan of the capacitive sensors between the ends of drive plates 114 and pickup plate 116. Because the scan speed is large in comparison with the finger swipe speed, a line scan of the fingerprint is produced.

One of skill in the art will appreciate that drive plates 114 need not be driven sequentially. In fact, the drive plates 114 may be driven in any order. Further, drive plates 114 need not be driven with bursts of master clock 302 signal, but may be driven by any periodic signal, such as a sine wave.

When its control input is activated, switch 310 delivers a gated clock signal from master clock 302 to low impedance buffer 314. Signal burst 312 output by low impedance buffer 314 is capacitively coupled to pickup plate 116. As discussed above,

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the capacitive coupling is a function of the fingerprint features passing over the sensor gap 118. When the input to switch 310 is not activated, low impedance buffer 314 drives its connected drive plate 114 to ground. Any parasitic fields between the activated drive plate and the inactive drive plates, consequently, are shorted to ground. By capacitive coupling, pickup plate 116 detects the signal bursts 312 and provides the capacitively coupled signals to a variable gain amplifier 316.

The gain of variable gain amplifier 316 may be controlled by the output of a digital-to-analog converter 318 connected to microprocessor and memory 130. The gain may be adjusted to provide a desired output level despite variable sensing conditions. The output provided by digital-to-analog converter 318 to variable gain amplifier 316 may result in a gain adjustment based on the impedance of the finger.

The signal output from variable gain amplifier 316 is supplied to a band pass filter 320. Band pass filter 320 is centered at the frequency of master clock 302 and may have a Q of 10.

The output of band pass filter 320 is multiplied in a mixer 306 by the clock signal from master clock 302. Mixer 306 performs synchronous envelope detection of signal bursts 312. The output of mixer 306 is a baseband pulse that represents the envelope of the capacitively coupled signal burst. In an alternative embodiment, synchronous rectification may be used for envelope extraction. The amplitude of the pulse output by mixer 306 is a function of the sampled topographic feature of the finger. The pulse amplitude modulated signal is supplied to a low pass filter 322. Low pass filter 322 removes unwanted high frequency harmonics produced by the mixing process. Low pass filter 322 may have group delay characteristics that compensate for phase distortions incurred in the previous signal processing stages. Low pass filter 322 may also be optimized for processing the information coming out of the mixer at the rate at which the drive plates 114 are scanned.

An analog-to-digital converter 324 converts the output of low pass filter 322 to a digital value. Analog-to-digital converter 324 may have, for example, a resolution of 8-12 bits and is, therefore, capable of resolving the output of low pass filter 322 into, in this example, 256-4096 values. Analog-to-digital converter 324 operates at a sufficient speed (e.g., 200 kilosamples per second) to accommodate the scanning of image sensor 110. Microprocessor and memory 130 receives the output of analog-to-digital converter

324 and stores it in a line buffer described below in connection with Fig. 18. Each stored digital value represents the capacitance between a drive plate 114 and the pickup plate 116 at the time when that drive plate was energized by signal burst 312. The capacitance is modified by the fingerprint feature that passed over the sensor gap at the time when that drive plate was energized. As a result, each stored value represents a fingerprint feature.

It should be understood that the invention is not limited to the plate driving methodology discussed in connection with Fig. 3. For example, drive plates 114 may be activated in pairs and driven differentially. In this example, at each sampling, one drive plate of the active pair is driven with a signal burst that is out of phase with the signal burst with which the other drive plate 114 of the pair is driven.

Referring now to Fig. 4, a schematic representation of an embodiment of image sensor 110 is shown. The image sensor shown in the example of Fig. 4 has 11 drive plates. A practical fingerprint sensor has substantially more drive plates as described below. Primary field lines 204 and parasitic field lines 402 are shown for illustrative purposes. Signal burst 312 is shown connected to one of drive plates 114. When each drive plate 114 is driven by signal burst 312, parasitic field lines 402 are generated between the driven plate and its neighbor plates. However, since the inactive plates are connected to ground by low impedance buffers 314, parasitic field lines 402 are shorted to ground. Primary field lines 204, as noted above with respect to Figs. 2A and 2B, are modified by the finger, resulting in detectable changes in the signal capacitively coupled to pickup plate 116.

Drive plates 114 and pickup plate 116 are formed on substrate 206. Substrate 206 can be any suitable insulating material (e.g., Capton®). In some embodiments, the substrate is flexible so that it conforms to the macro contours of an object being sensed. A flexible substrate may be affixed to a rigid substrate support, as described below in connection with Fig. 5. However, a flat substrate may be used without impairing the capabilities of the sensor. In some embodiments, the substrate 206 may be a rigid or flexible printed circuit board having drive plates 114 and pickup plate 116 formed by conventional etching or deposition processes. These embodiments provide a highly durable fingerprint sensor.

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Drive plates 114 and pickup plate 116 may be formed of any conductive material, such as copper or aluminum. Drive plates 114 and pickup plate 116 may be formed on substrate 206 by any suitable process, including but not limited to etching, deposition and sputtering. Drive plates 114 and pickup plates 116 may be covered with a protective coating such as Capton®.

The width and spacing of drive plates 114 determines the resolution of the acquired fingerprint image. For example, to achieve an industry standard resolution of 500 dots per inch, the width of each drive plate 114 is approximately 25 micrometers (μm). Similarly, the gaps between adjacent drive plates 114 are 25 μm and the sensor gap 118 is 25 μm to achieve this resolution. This results in a center-to-center spacing of adjacent drive plates 114 of 50 μm.

Fig. 5 is a cross section of the image sensor on a flexible substrate. Drive plates 114 and pickup plate 116 (not shown in Fig. 5) are formed on a flexible substrate 500. The flexible substrate 500 is affixed to a rigid substrate support 510 having a contour that matches the contour of a typical finger. It is believed that the curved substrate 500 improves the quality of the fingerprint image.

As described above, the drive plates 114 and pickup plate 116 of image sensor 110 are substantially coplanar. When drive plates 114 and pickup plate 116 are formed on a flexible substrate, the plates of the image sensor may be deformed from a strictly planar configuration. However in this case, drive plates 114 and pickup plate 116 maintain their side-by-side arrangement and remain substantially coplanar in a local region adjacent to the sensor gaps. That is, any curvature of the flexible substrate is small on the scale of the sensor gaps.

It should be appreciated that the substrate 206 may be attached to a finger-fitting support (not shown) such that the sensor is permanently contoured to receive a finger. Substrate 206 may also be placed on a tab protruding from the circuit board on which sensor circuit 108 is fabricated, or on any other convenient and ergonomic surface.

Several embodiments of image sensors in accordance with the present invention are described below. It should be noted that the image sensors are described herein by way of example only, and that the invention is not limited in this respect.

Fig. 6 shows a top view of one example of a sensor according to an embodiment of the present invention. Drive plates 114 are arranged substantially parallel to each

other and substantially orthogonal to pickup plate 116. Drive plates 114 are separated from pickup plate 116 by sensor gap 118, over which the finger is swiped. The length of pickup plate 116 depends on the maximum fingerprint width to be scanned. The lengths of drive plates 114 are selected for convenient connection to the drive circuit.

Another embodiment of an image sensor according to the present invention is shown in Fig. 7. In Fig. 7, drive plates 114 follow different paths between pickup plate 116 and contacts 702. Contacts 702 provide connections of drive plates 114 to the drive circuit.

It should be appreciated from Figs. 6 and 7 that drive plates 114 can be any suitable length. Drive plates 114 should preferably have an ergonomically designed length such that the finger being scanned is not impeded by other elements of the system. The image sensor design should permit a smooth and continuous swipe of the finger being scanned.

In some embodiments, components of sensor circuit 108 may be mounted on the same substrate as the sensors 110 and 112. For example, sensors 110 and 112 may be placed on the opposite side of the substrate from sensor circuit 108. In this example, contacts 702 shown in Fig. 7 provide a connection between the drive circuit and the drive plates 114 through the substrate 206.

Fig. 8 illustrates yet another embodiment of an image sensor in accordance with the present invention. The image sensor of Fig. 8 utilizes two pickup plates 116a and 116b in conjunction with substantially U-shaped drive plates 114. In this embodiment, two sensor gaps may be energized simultaneously with a single drive signal, thereby increasing the efficiency of the device. Each pickup plate 116 may require a detection circuit as shown in Fig. 3. However, the number of connections to the drive plates is reduced by one half. It will be understood that a sensor with more than two pickup plates 116 and appropriately configured drive plates 114 may be utilized.

Embodiments of rate sensor 112 are described below for illustrative purposes only. The invention should not be considered as limited to the embodiments disclosed herein.

Fig. 9 shows a rate sensor 112 and an image sensor 110 in accordance with an embodiment of the present invention. Image sensor 110 includes drive plates 114 and pickup plate 116 spaced from the ends of drive plates 114 by sensor gap 118, as

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described above in connection with Figs. 4 and 6. The rate sensor includes two or more spaced-apart object detectors, described herein as finger detectors. Rate sensor 112 includes finger detectors 910, 912, 914 and 916. The finger detectors are spaced apart by a spacing 906 along the direction of finger swipe. The finger detectors 910, 912, 914 and 916 include portions located on opposite sides of image sensor 110 in the embodiment of Fig. 9. Each finger detector includes at least one drive plate and at least one pickup plate, which form a capacitive sensor. Thus, for example, finger detector 910 includes drive plates 910a and pickup plates 910b. The rate drive plates and the rate pickup plates are oriented substantially perpendicular to the direction of finger swipe. In the embodiment of Fig. 9, the rate pickup plates of each finger detector are connected to the pickup plate 116 of image sensor 110. The drive plates of the finger detectors may be activated sequentially by signal bursts, as described above in connection with the image sensor. Rate sensing and image sensing may be performed at different times, such as by time multiplexing, during the fingerprint scanning process.

The rate sensor 112, rather than sensing fingerprint features, senses the end of the finger as the finger is swiped across image sensor 110. The end of the finger is easier to detect than fingerprint features, because it is a macroscopic feature. In order to sense the bulk of the finger, the gap 920 between the rate plates may be larger than the gap 118 between imaging plates. This allows the electric field lines to penetrate deeper into the finger, reducing the effect of surface features, i.e. fingerprint ridges. Initially, the finger is placed on image sensor 110 and covers all of the finger detectors 910, 912, 914 and 916. As a result, the finger detectors all sense a similar capacitance value. As the finger moves from left to right, the finger end passes finger detector 910 at time t_1, passes finger detector 912 at time t_2, passes finger detector 914 at time t_3 and passes finger detector 916 at time t_4. Passage of the finger end over each finger detector produces a distinct change in capacitance and a corresponding change in the capacitively coupled drive signal. The changes in capacitively coupled drive signals occur as rate signals at times t_1, t_2, t_3 and t_4 for finger detectors 910, 912, 914 and 916, respectively. Since the spacing between the finger detectors is known, the time delay between the rate signals indicative of the finger end is an inverse function of finger speed.

The finger detectors of the rate sensor 112 are located only on the side of the sensor gap 118 of image sensor 110 from which direction the finger is swiped across the

sensor gap. The finger detectors are designed to cover an area of the finger from the furthest ridge desired to be imaged to the end of the finger. The presence or absence of a finger can be detected by measuring the change in the bulk capacitance produced by the finger end as it passes each finger detector. By recording the times of these transitions, such as times t_1, t_2, t_3 and t_4, a time history of finger position can be determined. The time history can be used to compute a finger velocity profile. The granularity of the velocity profile depends on the number of finger detectors and the spacing between finger detectors. Preferably, the spacing between finger detectors is a minimum of the width of three finger ridges, or approximately 0.035 to 0.050 inch.

A second embodiment of rate sensor 112 is shown in Fig. 10. In this embodiment, the orientation of image sensor 110 is reversed with respect to the direction of finger swipe. Rate sensor 112 is located on the opposite side of image sensor pickup plate 116 from drive plates 114. This configuration permits the rate drive plates and rate pickup plates to extend across the entire width of the sensor, thereby providing larger sensed signals. As shown in Fig. 10, rate sensor 112 includes finger detectors 1010, 1012, 1014 and 1016 spaced apart along the direction of finger swipe by a spacing 1006. Each of the finger detectors includes at least one rate drive plate and one rate pickup plate. Thus, for example, finger detector 1010 includes rate drive plate 1010a and rate pickup plate 1010b. The rate pickup plates of each of the finger detectors 1010, 1012, 1014 and 1016 are connected to the pickup plate 116 of image sensor 110. In other embodiments, the rate pickup plate and the image pickup plate can be electrically isolated and connected to separate sensing circuits.

A third embodiment of rate sensor 112 is shown in Fig. 11. The embodiment of Fig. 11 uses differential rate sensing. Rate sensor 112 includes finger detectors 1120, 1122, ...1130 positioned along the direction of finger swipe. Each of the finger detectors has a differential configuration. In particular, each finger detector includes a drive plate and first and second pickup plates located on opposite sides of the drive plate. For example, finger detector 1120 includes a drive plate 1140 and pickup plates 1142 and 1144 located on opposite sides of drive plate 1140. Pickup plate 1142 is spaced from drive plate 1140 by sensor gap 1150, and pickup plate 1144 is spaced from drive plate 1140 by sensor gap 1152. Drive plate 1140 and pickup plates 1142 and 1144 may be elongated conductors oriented perpendicular to the direction of finger swipe across the

image sensor 110. In the embodiment of Fig. 11, drive plate 1140 is wider than pickup plates 1142 and 1144 and is connected to a drive circuit via a contact 1146. Preferably, the differential finger detector has a symmetrical configuration, so that the capacitively coupled signals to pickup plates 1142 and 1144 are equal when a finger is not present or when a finger covers both rate sensor gaps 1150 and 1152. The other fingers detector may have a similar construction. In the embodiment of Fig. 11, the first pickup plates of the finger detectors are commonly connected to pickup line 1160, and the second pickup plates of the finger detectors are commonly connected to pickup line 1162.

As the end of the finger is swiped across the sensor gaps 1150 to 1152, a capacitance versus time profile can be created that has a large peak value due to a capacitance imbalance between pickup plates 1142 and 1144 of finger detector 1120 when the end of the finger has just crossed the first sensor gap 1150 but has not yet crossed the second sensor gap 1152. A differential signal peak is produced sequentially between first sensor gap 1150 and the second sensor gap 1152 as the finger detector 1120 is activated by its associated differential drive plate 1140, while the end of the finger passes. In one embodiment, as soon as the differential signal peak is detected in one finger detector 1120, the next adjacent finger detector 1122 is activated. This sequence continues until a differential signal peak has been detected by the last finger detector 1130.

Fig. 12 illustrates another embodiment of the differential rate sensor shown in Fig. 11. The differential rate sensor shown in Fig. 12 is similar to the differential rate sensor shown in Fig. 11 and described above, except that the drive plates and the pickup plates of each finger detector are curved to match the contour of a typical finger end. In particular, rate sensor 112 includes differential finger detectors 1220, 1222, ...1230. Finger detector 1220 includes a curved drive plate 1240 and curved pickup plates 1242 and 1244 located on opposite sides of drive plate 1240. Pickup plate 1242 is spaced from drive plate 1240 by sensor gap 1250, and pickup plate 1244 is spaced from drive plate 1240 by sensor gap 1252. The remaining finger detectors have a similar construction. The curved plates of the finger detectors improve the signal-to-noise ratio of the differential rate sensor. It will be understood that different curvatures and shapes of the drive plates and pickup plates may be utilized for sensing objects other than fingers.

Another embodiment of a differential rate sensor is shown in Fig. 13. In this embodiment, a single drive plate 1302 has a serpentine configuration between a comb-like array of pickup plates. In other respects, rate sensor of Fig. 13 is similar to the differential rate sensor of Fig. 11. Referring to Fig. 13, differential rate sensor 112 includes differential finger detectors 1320, 1322, 1324, ...1330. Each finger detector includes first and second pickup plates positioned on opposite sides of the respective drive plate. For example, finger detector 1320 includes a section of serpentine drive plate 1302 and pickup plates 1342 and 1344 positioned on opposite sides of that section of drive plate 1302. Pickup plate 1342 is spaced from drive plate 1302 by sensor gap 1350, and pickup plate 1344 is spaced from drive plate 1302 by sensor gap 1352. The remaining finger detectors have a similar construction. In the embodiment of Fig. 13, a common serpentine drive plate is utilized. In addition, the first pickup plates of the finger detectors are commonly connected, and the second pickup plates of the finger detectors are commonly connected.

As a finger is initially swiped across the differential rate sensor of Fig. 13, all the finger detectors 1320, 1322, 1324, ...1330 are covered by dielectric and no net differential signal is produced in the pickup plates 1342 and 1344. As soon as the end of the finger swipes past the first sensor gap 1350 and is between the first sensor gap 1350 and the second sensor gap 1352, a net differential signal appears on the pickup plates 1342 and 1344. This phenomenon is repeated as the end of passes the next finger detector 1322 until the end of the finger reaches the last finger detector 1330.

Another embodiment of the rate sensor 112 is shown in Fig. 14. The embodiment of Fig. 14 is similar to the embodiment of Fig. 13, except that the drive plates and the pickup plates of each finger detector are curved to match a typical finger end. In particular, rate sensor 112 includes finger detectors 1420, 1422, 1424, ...1430. Each finger detector includes a curved drive plate and first and second pickup plates located on opposite sides of the drive plate. For example, finger detector 1420 includes curved drive plate 1440 and curved pickup plates 1442 and 1444 on opposite sides of drive plate 1440.

In each embodiment of the rate sensor, the drive plates and the pickup plates of each finger detector are preferably coplanar. Furthermore, the rate sensor and the image sensor can be fabricated on a single substrate so that the image drive plates and the image

pickup plate of the image sensor and the rate drive plates and the rate pickup plates of the rate sensor are all substantially coplanar.

Fig. 15 is a block diagram of an embodiment of rate sensing circuit 122 (Fig. 1A) and microprocessor and memory 130 for deriving rate information from the rate sensor embodiments of Figs. 9 and 10. Rate sensor mux scanning logic 1502 sequentially asserts its output lines in response to signals from microprocessor and memory 130. In response to an asserted output signal from rate sensor mux scanning logic 1502, a switch 1504 closes, thereby gating the clock signal from master clock 302 to a low impedance buffer 1506. A signal burst 1508, derived from the clock signal, is output from the selected switch 1504 and passes through buffer 1506 to the drive plate of one of the finger detectors 1010, 1012, ...1016.

In the embodiments shown in Figs. 9 and 10, pickup plate 116 serves as an image sensor pickup plate and as a rate sensor pickup plate. The output of pickup plate 116 is supplied to a band pass filter 1510. Band pass filter 1510 has a center frequency of the clock signal. The filtered signal is provided to a mixer 1512, where it is multiplied by the clock signal. As described in connection with Fig. 3, the mixer functions as a synchronous envelope detector. The pulse amplitude modulated signal output by mixer 1512 is supplied through a low pass filter 1514 to a pulse detector 1516. Pulse detector 1516 supplies a trigger signal to a rate sensor event timer 1818, shown in Fig. 18. The pulse detector 1516 may be implemented as a comparator with a threshold that is programmed by the microprocessor, or in software by sampling the rate sensor output with an analog-to-digital converter and comparing the result to a digital threshold. The threshold of pulse detector 1516 is adjusted to generate an output trigger signal when the finger end passes each of the finger detectors.

Fig. 16 is a block diagram of an embodiment of rate sensing circuit 122 (Fig. 1A) and microprocessor and memory 130 for deriving rate information from the differential rate sensor embodiments of Figs. 11 and 12. The rate sensing circuit of Fig. 16 differs from the rate sensing circuit of Fig. 15 in that the differential rate sensor has a differential output. In particular, the commonly connected pickup lines 1160 and 1162 of finger detectors 1120, 1122, ...1130 are connected to a differential band pass filter 1602. The outputs of band pass filter 1602 are connected to inputs of a differential mixer 1604. Mixer 1604 multiples the differential inputs by the clock signal to obtain a

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baseband pulse that represents the envelope of the capacitively coupled signal bursts. As in the embodiment of Fig. 15, mixer 1604 functions as a synchronous envelope detector. The output of mixer 1604 is supplied through low pass filter 1514 to pulse detector 1516 for determining rate information as described above.

Fig. 17 is a block diagram of an embodiment of rate sensing circuit 122 (Fig. 1A) and microprocessor and memory 130 deriving rate information from the differential rate sensor embodiments of Figs. 13 and 14. As described above, the embodiments of Figs. 13 and 14 utilize a single drive plate having a serpentine configuration. The rate sensing circuit of Fig. 17 differs from the rate sensing circuit of Fig. 16 in that a single drive circuit is required for the serpentine drive plate 1302. A single switch 1710 gates the clock signal, in response to a control signal from microprocessor and memory 130, through a buffer 1712 to supply a signal burst 1714 to serpentine drive plate 1302. The outputs of the rate sensor on pickup lines 1160 and 1162 are provided to differential band pass filter 1602 as in the embodiment of Fig. 16.

It will be understood that the rate sensing circuit may use the same master clock as the image sensing circuit or a different clock having a different frequency that is selected to optimize rate sensing.

Fig. 18 is a block diagram of a data acquisition and control processor in accordance with an embodiment of the invention. Microprocessor and memory 130 and its connection to the image sensing circuit and the rate sensing circuit are shown in Fig. 18. Microprocessor and memory 130 may include a microprocessor 1804 connected by a memory bus 1814 to a line buffer 1808, a rate sensor event memory 1810 and an image buffer memory 1812. Line buffer memory 1808 may store image data for a single line scan of the image sensor. Image buffer memory 1812 may store one or more entire fingerprint images. Rate sensor event memory 1810 may store finger detector numbers and rate sensor event times for determining finger speed. Microprocessor 1804 may be connected by an I/O bus 1802 to mux scanning logic 304 (Fig. 3) of the image sensing circuit and A/D converter 324 of the image sensing circuit. Microprocessor 1804 may further be connected via I/O bus 1802 to rate sensor mux scanning logic 1502 of the rate sensing circuit (Fig. 15) and to rate sensor event timer 1818, which determines the time delay between rate sensor events. A scan timer 1806 connected to I/O bus 1802 is used to initiate line scan sequences.

Fig. 19 is a flow diagram of an embodiment of a rate sensor method for use with the single-ended rate sensor embodiments of Figs. 9 and 10 and the rate sensing circuit of Fig. 15. In step 1902, background signal levels from each rate sensor finger detector are collected. In step 1904, the rate sensor event timer 1818 (Fig. 18) is started. Then, in step 1906, a rate event number T is set to zero. An active rate sensor number R is set to 1 in step 1908. The finger detector corresponding to the active rate sensor number R is activated in step 1910. After the capacitively coupled drive signal is detected and processed, the pulse detector 1516 output is read in step 1912, and the background signal level is subtracted in step 1914. If a pulse is detected step 1916, the active finger detector number and event time are stored in the rate event buffer 1810 shown in Fig. 18. In step 1920, the rate event number T is incremented. If the active finger detector is determined in step 1922 to be the last finger detector in the rate sensor, the method exits. If the active finger detector is not the last finger detector, the active rate sensor number R is incremented in step 1924, and the method returns to step 1910 for continued execution. If a pulse was not detected in step 1916 the method returns to step 1910 for continued execution.

It will be understood that the method of Fig. 19 scans each finger detector of the rate sensor sequentially until a single transition is detected, and then proceeds to the next finger detector. In other embodiments, the method may scan all finger detectors, and determine if there are transitions on any of the finger detectors. This advantageously provides detection of missed transitions.

Fig. 20 is a flow diagram of an embodiment of a rate sensor method for use with the differential rate sensor embodiments of Figs. 11 and 12 and the rate sensing circuit of Fig. 16. The initialization procedure of steps 2004, 2006 and 2008 is similar to that of Fig. 19, except that background signal levels are not detected. As with the embodiment of Fig. 19, the finger detector corresponding to the active rate sense drive plate number is activated in step 2010, and the pulse detector 1516 output is read in step 2012. If a pulse is detected in step 2014, the active finger detector number R and event time are stored in the rate event buffer 1810 in step 2016. The rate event number T is subsequently incremented in step 2018. If the active plate number is determined in step 2020 to be to the last finger detector in the rate sensor, the method exits. If the active finger detector is not the last finger detector, the active rate sensor number R is incremented in step 2022

and the method returns to step 2010 for further processing. If a pulse was not detected in step 2014 the method returns to step 2010 for continued execution.

It will be understood that the method of Fig. 20 scans each finger detector of the rate sensor sequentially until a single transition is detected, and then proceeds to the next finger detector. In other embodiments, the method may scan all finger detectors, and determine if there are transitions on any of the finger detectors. This advantageously provides detection of missed transitions.

Fig. 21 is a flow diagram of an embodiment of a rate sensor method for use with the differential rate sensor embodiments of Figs. 13 and 14 and the rate sensing circuit of Fig. 17. The rate sensor event timer and rate event number T are initialized in steps 2104 and 2106, respectively. In step 2108, a rate event count C is initialized. In step 2110, rate sensor pulse detector 1516 is read after the serpentine drive plate 1302 has been activated with a drive signal and the differential output of the rate sensor has been detected and processed. If a pulse is detected in step 2112, the rate event time is stored in the rate event buffer 1810 in step 2114, the rate event number T is incremented in step 2116, and the rate event count C is incremented in step 2118. If the rate event count C is determined in step 2120 to be equal to the number of finger detectors in the rate sensor, the method exits. If the rate event count C is not equal to the number of finger detectors in the rate sensor, or if a pulse is not detected in step 2112, then the method returns to step 2110 for further processing.

Fig. 22 is a flow chart of an image line acquisition process in accordance with an embodiment of the present invention. In step 2204, a drive plate number N is initialized. The drive plate 114 corresponding to the plate number N is activated, and all other drive plates 114 are driven to ground in step 2206. Following detection and processing of the capacitively coupled drive signal, the output of A/D converter 324 (Fig. 3) is read in step 2208. The value read from analog-to-digital converter 324 is stored in the line buffer 1808 (Fig. 18) in step 2210. The plate number N is incremented in step 2212, and if all of the drive plates 114 in the image sensor are determined in step 2214 to have been activated, the process ends. If all drive plates in the image sensor have not been activated, the method returns to step 2206 for continued execution.

Fig. 23 is a flow chart of an image acquisition method that utilizes fixed time interval line sampling in accordance with an embodiment of the invention. In step 2304,

an image line variable L is initialized. The line scan timer 1806 (Fig. 18) is initialized to a desired line scan time in step 2306. Subsequently, a next tick event from timer 1806 is enabled in step 2308. In step 2310, the process waits for a tick event from line scan timer 1806. After a tick event occurs, the line scan timer 1806 is restarted in step 2312. In step 2314, a line of image data is acquired, for example, in accordance with the line acquisition method described above in connection with Fig. 22. When a line of image data has been acquired, the contents of line buffer 1808 (Fig. 18) are stored in image buffer 1812 (Fig. 18). In step 2318, the image line variable L is incremented. If the entire image has been acquired (step 2320), i.e. L = the number of lines in the complete image, the process is complete. If the entire image has not been acquired, the process returns to step 2308 for further processing.

In one embodiment, an image acquired by this method is advantageously resampled based on the rate data gathered in the rate sensor event memory 1810 to produce an image whose lines are spaced at fixed distance intervals.

Fig. 24 illustrates a flow chart of another embodiment of an image acquisition method in accordance with the invention. In this embodiment, the line sampling time is controlled by a rate sensor. The image line number L is initialized in step 2404, and the line scan timer 1806 is set to the desired line scan time in step 2406. In step 2408, the next tick event from line scan timer 1806 is enabled. In step 2410, the process waits for a tick event from line scan timer 1806. If any rate events have been detected in step 2412 since the last line was acquired, a new line interval is computed from the most recent rate data in step 2414. The line scan timer 1806 is then set to the new line interval in step 2416. Subsequently, or if any rate events were not detected between the prior line acquisition and the tick event, line scan timer 1806 is restarted in step 2418. In step 2420, a line is acquired, for example, in accordance with the line acquisition method described above in connection with Fig. 22. The contents of line buffer 1808 (Fig. 18) are then stored in image buffer 1812 in step 2422. Then, the image line number L is incremented in step 2424. If the entire image has been acquired (step 2426), then the process is complete. If the entire image has not been acquired, the method returns to step 2408 for further processing.

Having thus described several illustrative embodiments of the invention, various alterations, modifications and improvements will readily occur to those skilled in the art.

Such alterations, modifications and improvements are intended to be within the spirit and scope of the invention. Accordingly, the foregoing description is by way of example only as defined in the following claims and the equivalents thereto.

What is claimed is:

CLAIMS

1. Image sensing apparatus comprising:

at least one image pickup plate disposed generally laterally with respect to a direction of movement of an object; and

a plurality of image drive plates in spaced relation to said image pickup plate to define a plurality of sensor gaps, wherein features of the object passing over said sensor gaps produce a change in capacitance between respective image drive plates and said image pickup plate.

2. Image sensing apparatus as defined in claim 1, wherein said at least one image pickup plate and said plurality of image drive plates are dimensioned and spaced for sensing a fingerprint.

3. Image sensing apparatus as defined in claim 2, wherein a spacing between each of said image drive plates and said image pickup plate is less than about one half of the ridge spacing on a typical fingerprint.

4. Image sensing apparatus as defined in claim 2, wherein a spacing between adjacent ones of said image drive plates is less than about one half of the ridge spacing on a typical fingerprint.

5. Image sensing apparatus as defined in claim 1, wherein said image drive plates comprise parallel conductors disposed perpendicular to said image pickup plate and spaced from said image pickup plate by respective sensor gaps.

6. Image sensing apparatus as defined in claim 1, wherein said at least one image pickup plate comprises two or more image pickup plates disposed generally laterally with respect to the direction of movement of the object.

7. Image sensing apparatus as defined in claim 2, including at least about 250 image drive plates.

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8. Image sensing apparatus as defined in claim 1, further comprising a substrate, wherein said at least one image pickup plate and said plurality of image drive plates comprise conductive traces on said substrate.

9. Image sensing apparatus as defined in claim 8, wherein said substrate comprises a printed circuit board.

10. Image sensing apparatus as defined in claim 8, wherein said substrate comprises a flexible substrate.

11. Image sensing apparatus as defined in claim 10, further comprising a substrate support, wherein said flexible substrate is affixed to said substrate support and wherein said substrate support has a contour selected to substantially match the contour of a typical finger.

12. Image sensing apparatus as defined in claim 1, further comprising:

an excitation circuit for sequentially energizing said image drive plates with drive signals, and

a detection circuit for detecting the drive signals capacitively coupled from said image drive plates to said image pickup plate to provide image signals.

13. Image sensing apparatus as defined in claim 12, wherein said drive signals comprise sequential signal bursts applied to respective ones of said image drive plates.

14. Image sensing apparatus as defined in claim 13, wherein said excitation circuit includes circuitry for coupling non-energized image drive plates to a reference potential.

15. Image sensing apparatus as defined in claim 13, wherein said signal bursts comprise bursts of a clock signal.

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16. Image sensing apparatus as defined in claim 13, wherein said detection circuit comprises a synchronous detector for providing pulses in response to the detected signal bursts.

17. Image sensing apparatus as defined in claim 16, further comprising an analog-to-digital converter for converting said pulses to digital values, a memory and a processor for storing the digital values in said memory.

18. Image sensing apparatus as defined in claim 17, wherein said processor initiates a plurality of sequential line scans of said image drive plates to provide a plurality of line scans along lines of the moving object.

19. Image sensing apparatus as defined in claim 12, wherein said detection circuit includes an amplifier for receiving the capacitively coupled drive signals, said amplifier having a gain that is an inverse function of the amplitude of the capacitively coupled drive signals.

20. Rate sensing apparatus comprising:

two or more object detectors spaced apart along a direction of movement of an object, each of said object detectors including at least one rate drive plate and at least one rate pickup plate, wherein an end of an object passing over each of said object detectors produces a change in capacitance between respective rate drive plates and rate pickup plates.

21. Rate sensing apparatus as defined in claim 20, wherein the rate drive plate and the rate pickup plate of each of said object detectors are disposed generally laterally with respect to the direction of movement of the object.

22. Rate sensing apparatus as defined in claim 20, wherein the rate pickup plates of said sets of rate sensing plates are commonly connected.

23. Rate sensing apparatus as defined in claim 20, wherein each of said object detectors includes first and second rate pickup plates disposed on opposite sides of the rate drive plate to form a differential rate sensor.

24. Rate sensing apparatus as defined in claim 23, wherein the rate drive plates of said object detectors are commonly connected.

25. Rate sensing apparatus as defined in claim 20, wherein the rate drive plates and the rate pickup plates of said object detectors are dimensioned and spaced for detecting the speed of a moving finger.

26. Rate sensing apparatus as defined in claim 25, wherein the rate drive plates and the rate pickup plates of said object detectors are curved to substantially match the curve of a typical finger end.

27. Rate sensing apparatus as defined in claim 25, further comprising a substrate, wherein said rate drive plates and said rate pickup plates comprise conductive traces on said substrate.

28. Rate sensing apparatus as defined in claim 20, further comprising a flexible substrate, wherein said rate drive plates and said rate pickup plates comprise conductive traces on said flexible substrate.

29. Rate sensing apparatus as defined in claim 27, wherein said substrate comprises a printed circuit board.

30. Rate sensing apparatus as defined in claim 20, further comprising:

an excitation circuit for energizing the rate drive plates of said object detectors with drive signals, and

a detection circuit for detecting the drive signals capacitively coupled from the rate drive plate to the rate pickup plate of each of said object detectors to provide rate signals.

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31. Rate sensing apparatus as defined in claim 30, wherein said drive signals comprise signal bursts.

32. Rate sensing apparatus as defined in claim 31, wherein said signal bursts comprise bursts of a clock signal.

33. Rate sensing apparatus as defined in claim 31, wherein said detection circuit comprises a synchronous detector.

34. Rate sensing apparatus as defined in claim 30, further comprising a processing circuit for determining a time delay between said rate signals from said object detectors, wherein said time delay between said rate signals is representative of a speed of the object.

35. A fingerprint sensing system comprising:

an image sensor comprising a linear array of capacitive sensors for capacitive sensing of ridge peaks and ridge valleys of a fingerprint on a moving finger;

a rate sensor for sensing a speed of the finger as it moves across said image sensor; and

a sensor circuit for excitation of said image sensor with image drive signals and for detection of image signals in response to said image drive signals, for excitation of said rate sensor with rate drive signals and for detection of rate signals in response to said rate drive signals, and for coordinating said image signals and said rate signals to provide a fingerprint image.

36. A fingerprint sensing system as defined in claim 35, wherein said image sensor comprises:

at least one image pickup plate disposed generally laterally with respect to a direction of movement of the finger; and

a plurality of image drive plates in spaced relation to said image pickup plate to define a plurality of sensor gaps, wherein ridge peaks and ridge valleys of the fingerprint

passing over said sensor gaps produce a change in capacitance between respective image drive plates and said image pickup plate.

37. A fingerprint sensing system as defined in claim 36, wherein a spacing between each of said image drive plates and said image pickup plate is less than about one half of the ridge spacing on a typical fingerprint.

38. A fingerprint sensing system as defined in claim 36, wherein a spacing between adjacent ones of said image drive plates is less than about one half of the ridge spacing on a typical fingerprint.

39. A fingerprint sensing system as defined in claim 36, wherein said image drive plates comprise parallel conductors disposed perpendicular to said image pickup plate and spaced from said image pickup plate by respective sensor gaps.

40. A fingerprint sensing system as defined in claim 36, wherein said at least one image pickup plate comprises two or more image pickup plates disposed generally laterally with respect to the direction of movement of the finger.

41. A fingerprint sensing system as defined in claim 36, including at least about 250 image drive plates.

42. A fingerprint sensing system as defined in claim 36, further comprising a substrate, wherein said at least one image pickup plate and said plurality of image drive plates comprise conductive traces on said substrate.

43. A fingerprint sensing system as defined in claim 42, wherein said substrate comprises a flexible substrate.

44. A fingerprint sensing system as defined in claim 43, further comprising a substrate support, wherein said flexible substrate is affixed to said substrate support and

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wherein said substrate support has a contour selected to substantially match the contour of a typical finger.

45. A fingerprint sensing system as defined in claim 36, wherein said sensor circuit comprises:

an excitation circuit for sequentially energizing said image drive plates with said image drive signals, and

a detection circuit for detecting the image drive signals capacitively coupled from said image drive plates to said image pickup plate to provide said image signals.

46. A fingerprint sensing system as defined in claim 45, wherein said image drive signals comprise sequential signal bursts applied to respective ones of said image drive plates.

47. A fingerprint sensing system as defined in claim 46, wherein said excitation circuit includes circuitry for coupling non-energized image drive plates to a reference potential.

48. A fingerprint sensing system as defined in claim 46, wherein said detection circuit comprises a synchronous detector for providing pulsed image signals.

49. A fingerprint sensing system as defined in claim 48, wherein said sensor circuit further comprises an analog-to-digital converter for converting said pulsed image signals to digital values, a memory and a processor for storing the digital values in said memory.

50. A fingerprint sensing system as defined in claim 49, wherein said processor initiates a plurality of sequential line scans of said image drive plates to provide a plurality of line scans along lines of the moving finger.

51. A fingerprint sensing system as defined in claim 45, wherein said detection circuit includes an amplifier for receiving the capacitively coupled image drive signals,

said amplifier having a gain that is an inverse function of the amplitude of the capacitively coupled image drive signals.

52. A fingerprint sensing system as defined in claim 35, wherein said rate sensor comprises:

two or more finger detectors spaced apart along a direction of movement of the finger, each of said finger detectors including at least one rate drive plate and at least one rate pickup plate, wherein an end of the finger passing over each of said finger detectors produces a change in capacitance between respective rate drive plates and rate pickup plates.

53. A fingerprint sensing system as defined in claim 52, wherein the rate drive plate and the rate pickup plate of each of said finger detectors are disposed generally laterally with respect to the direction of movement of the finger.

54. A fingerprint sensing system as defined in claim 52, wherein the rate pickup plates of said finger detectors are commonly connected.

55. A fingerprint sensing system as defined in claim 52, wherein each of said finger detectors includes first and second rate pickup plates disposed on opposite sides of the rate drive plate to form a differential capacitive sensor.

56. A fingerprint sensing system as defined in claim 55, wherein the rate drive plates of said finger detectors are commonly connected.

57. A fingerprint sensing system as defined in claim 52, wherein the rate drive plates and the rate pickup plates of said finger detectors are curved to substantially match the curve of a typical finger end.

58. A fingerprint sensing system as defined in claim 52, further comprising a substrate, wherein said rate drive plates and said rate pickup plates comprise conductive traces on said substrate.

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59. A fingerprint sensing system as defined in claim 52, further comprising a flexible substrate, wherein said rate drive plates and said rate pickup plates comprise conductive traces on said flexible substrate.

60. A fingerprint sensing system as defined in claim 52, wherein said sensor circuit comprises:

an excitation circuit for energizing the rate drive plates of said finger detectors with said rate drive signals, and

a detection circuit for detecting the rate drive signals capacitively coupled from the rate drive plate to the rate pickup plate of each of said finger detectors to provide said rate signals.

61. A fingerprint sensing system as defined in claim 60, wherein said rate drive signals comprise signal bursts.

62. A fingerprint sensing system as defined in claim 61, wherein said detection circuit comprises a synchronous detector.

63. A fingerprint sensing system as defined in claim 60, wherein said sensor circuit further comprises a processing circuit for detecting a time delay between said rate signals from said finger detectors, wherein said time delay between said rate signals is representative of the speed of the finger.

64. A fingerprint sensing system as defined in claim 35, further comprising a substrate, wherein said image sensor and said rate sensor are fabricated on said substrate.

65. A fingerprint sensing system as defined in claim 64, wherein said substrate comprises a flexible substrate.

66. A fingerprint sensing system as defined in claim 64, wherein said sensor circuit is mounted on said substrate.

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67. A fingerprint sensing method, comprising the steps of:

capacitively sensing ridge peaks and ridge valleys of a fingerprint on a swiped finger with a linear array of capacitive sensors and providing image signals representative of a line of the fingerprint; and

acquiring from the linear array of capacitive sensors image signals representative of multiple lines of the fingerprint to provide a fingerprint image.

68. A fingerprint sensing method, comprising the steps of:

capacitively sensing ridge peaks and ridge valleys of a fingerprint on a swiped finger with a linear array of capacitive sensors and providing image signals;

sensing a speed of the finger as it is swiped across the linear array of capacitive sensors and providing rate signals; and

coordinating the image signals and the rate signals to provide a fingerprint image.

69. Image sensing apparatus as defined in claim 1, wherein said at least one image pickup plate and said plurality of image drive plates are substantially coplanar.

70. Rate sensing apparatus as defined in claim 20, wherein the rate drive plate and the rate pickup plate of each of said object detectors are substantially coplanar.

71. A fingerprint sensing system as defined in claim 36, wherein said at least one image pickup plate and said plurality of drive plates are substantially coplanar.

72. A fingerprint sensing system as defined in claim 52, wherein the rate drive plate and the rate pickup plate of each of said finger detectors are substantially coplanar.

73. A capacitive sensor comprising:

at least one pickup plate; and

a plurality of drive plates in spaced relation to said pickup plate to define an array of sensor gaps, said pickup plate and said plurality of drive plates being substantially

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coplanar, wherein an object passing above said array of sensor gaps produces a change in capacitance between respective drive plates and said pickup plate.

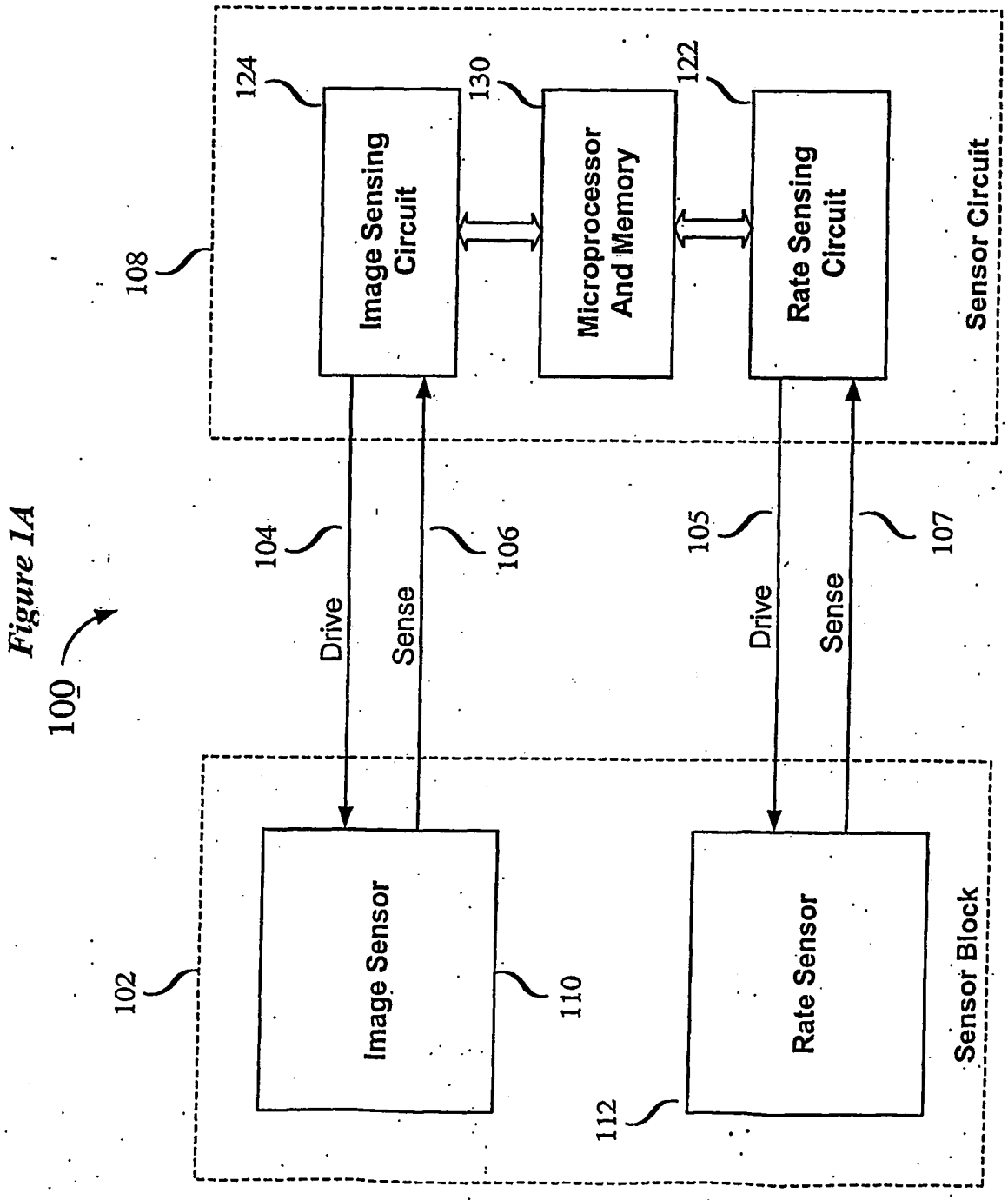
74. A capacitive sensor as defined in claim 73, wherein said pickup plate and said plurality of drive plates comprise conductive traces on a substrate.

75. A capacitive sensor as defined in claim 74, wherein said substrate comprises a flexible substrate.

76. A capacitive sensor as defined in claim 73, wherein said pickup plate and said plurality of drive plates are dimensioned and spaced for sensing a fingerprint.

77. A capacitive sensor as defined in claim 73, wherein said array of sensor gaps comprises a linear array.

78. A capacitive sensor as defined in claim 76, wherein said sensor gaps have dimensions of about 25 to 50 micrometers.


Figure 1A
100
108
Sensor Circuit
124
Image Sensing Circuit
130
Microprocessor And Memory
122
Rate Sensing Circuit
104
Drive
106
Sense
105
Drive
107
Sense
102
Sensor Block
Image Sensor
110
Rate Sensor
112

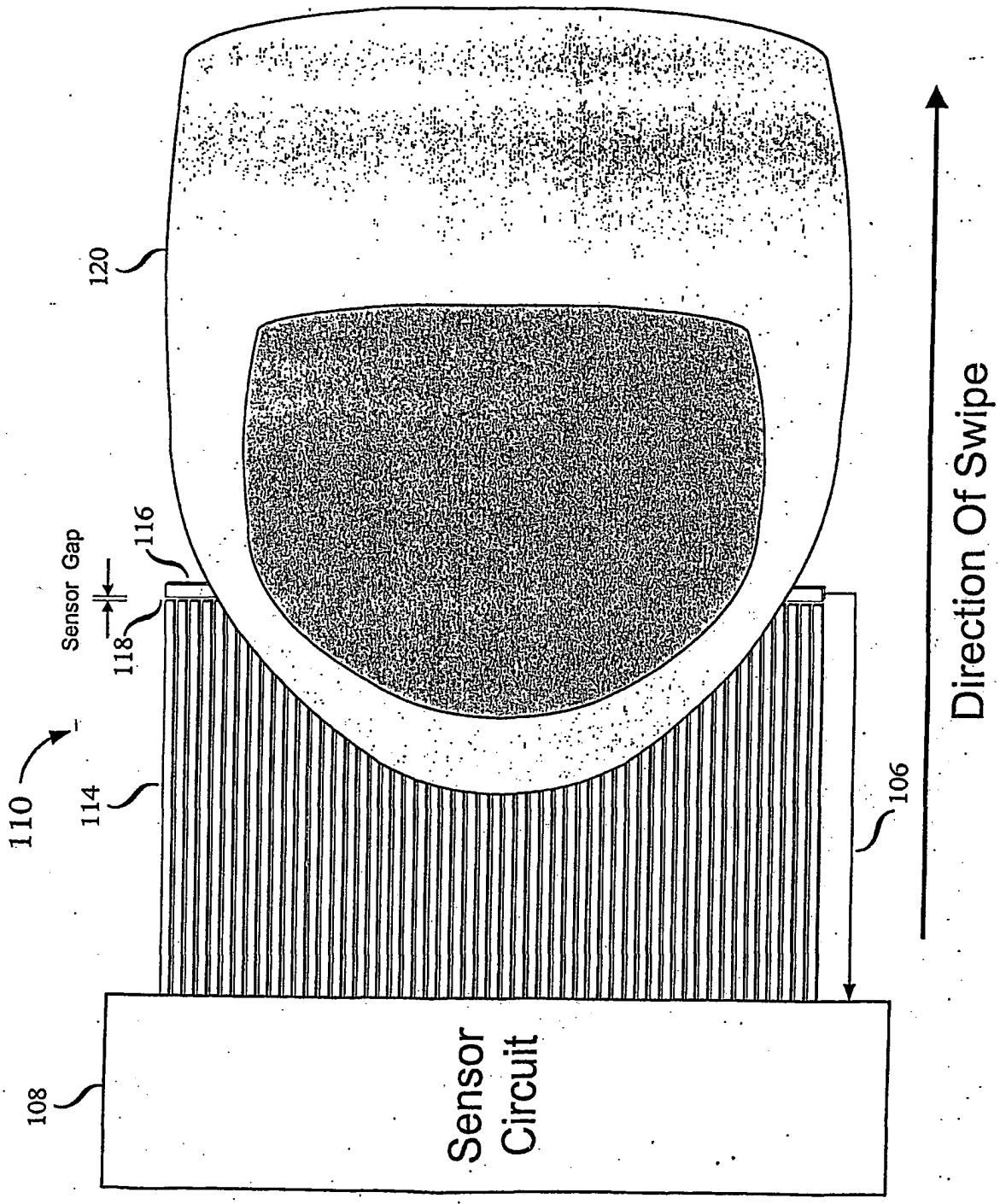

120
116
Sensor Gap
118
110
114
106
108
Sensor Circuit
Direction Of Swipe

Figure 1B

Figure 2A

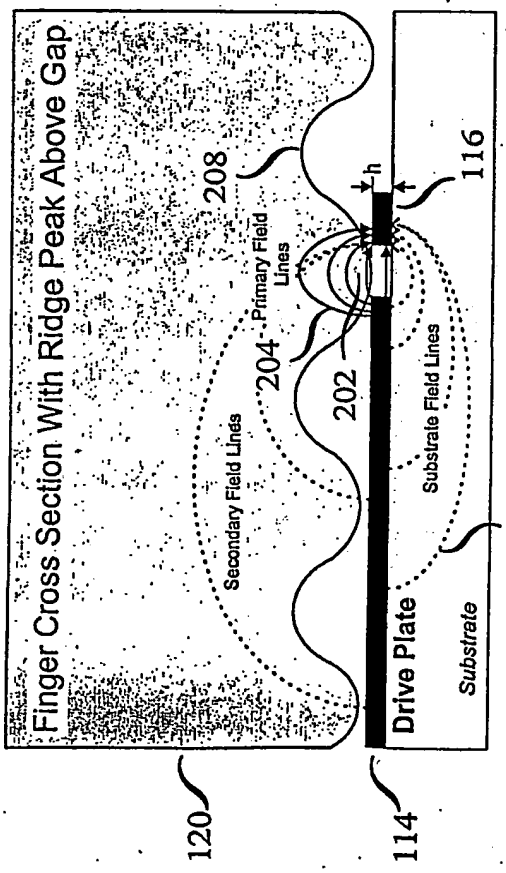
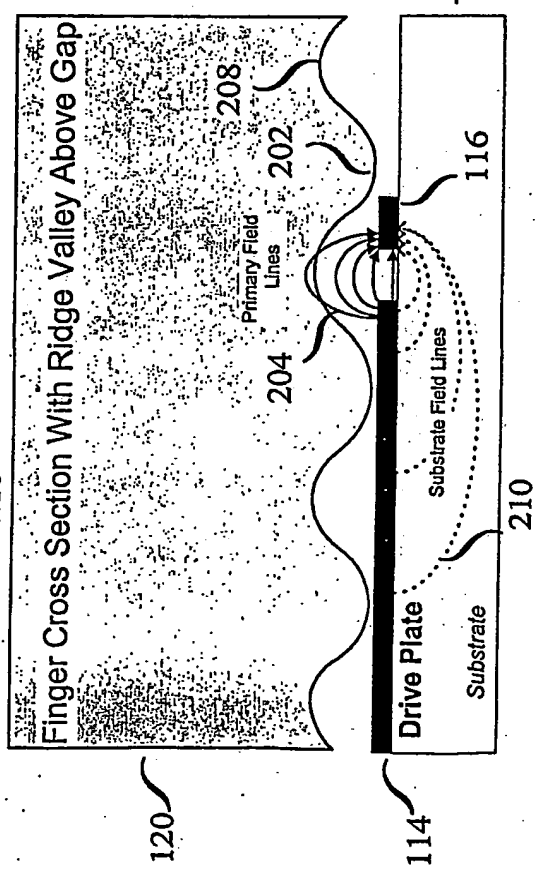


Figure 2B



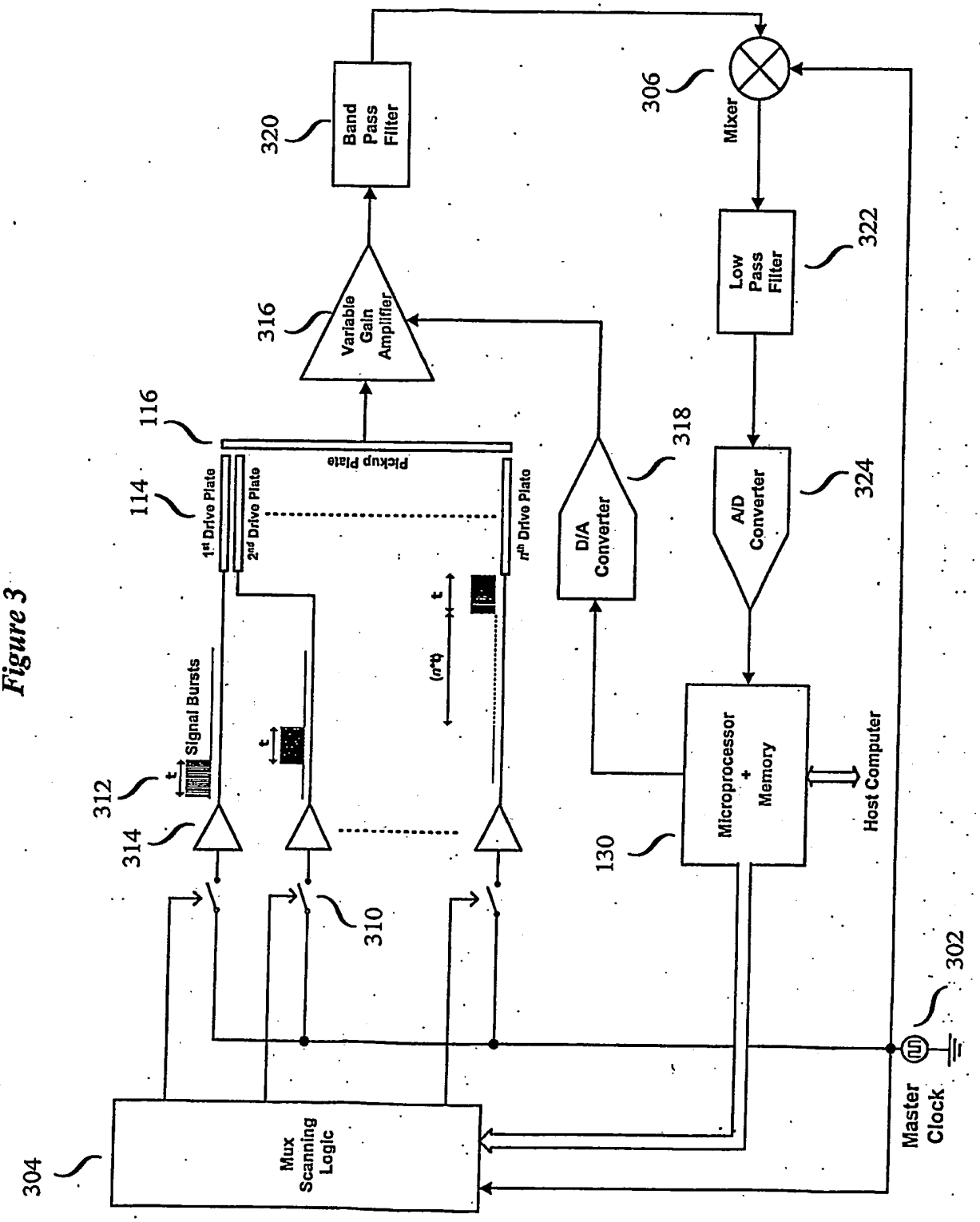

Band Pass Filter
320
Mixer
306
Low Pass Filter
322
Variable Gain Amplifier
316
D/A Converter
318
A/D Converter
324
116
Pickup Plate
114
1st Drive Plate
2nd Drive Plate
nth Drive Plate
Signal Bursts
312
314
310
Microprocessor + Memory
130
Host Computer
Master Clock
302
Mux Scanning Logic
304

Figure 3

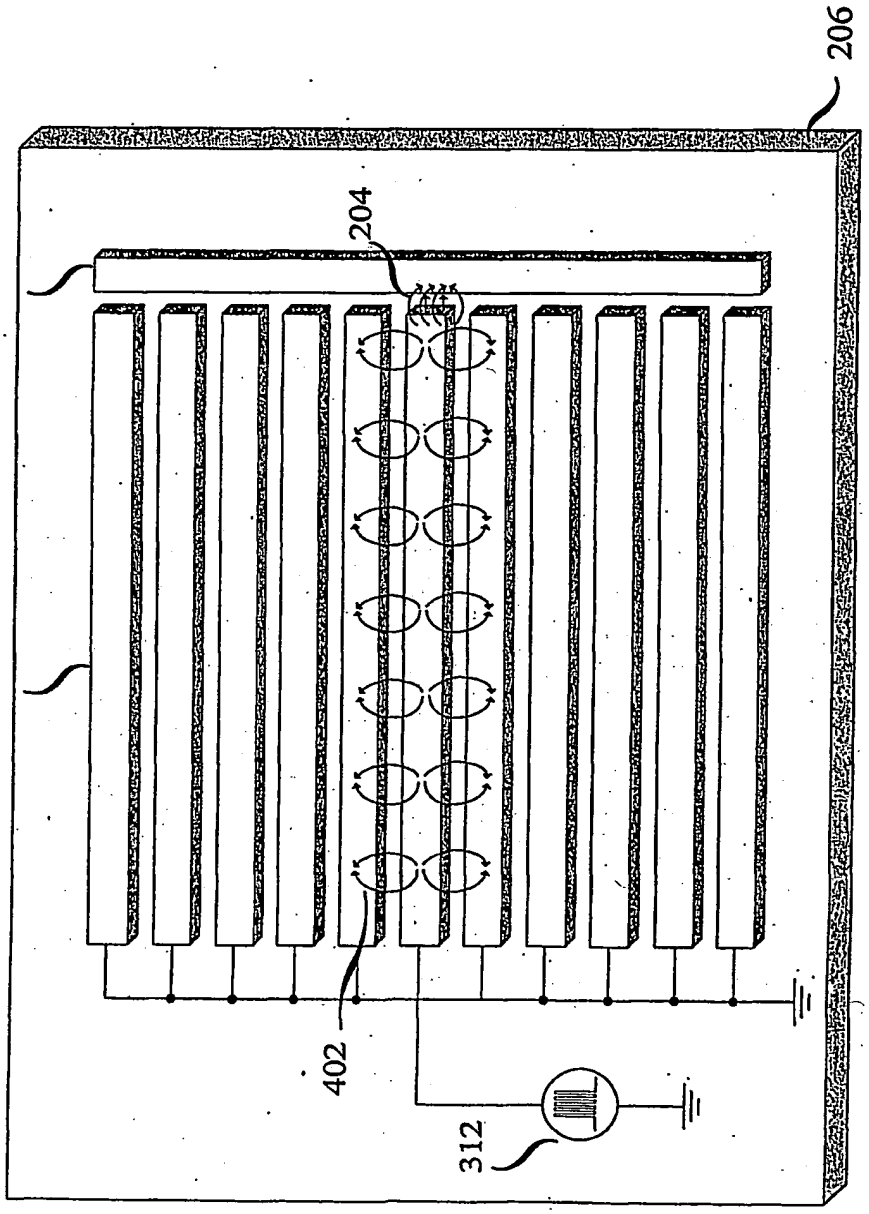


Figure 4

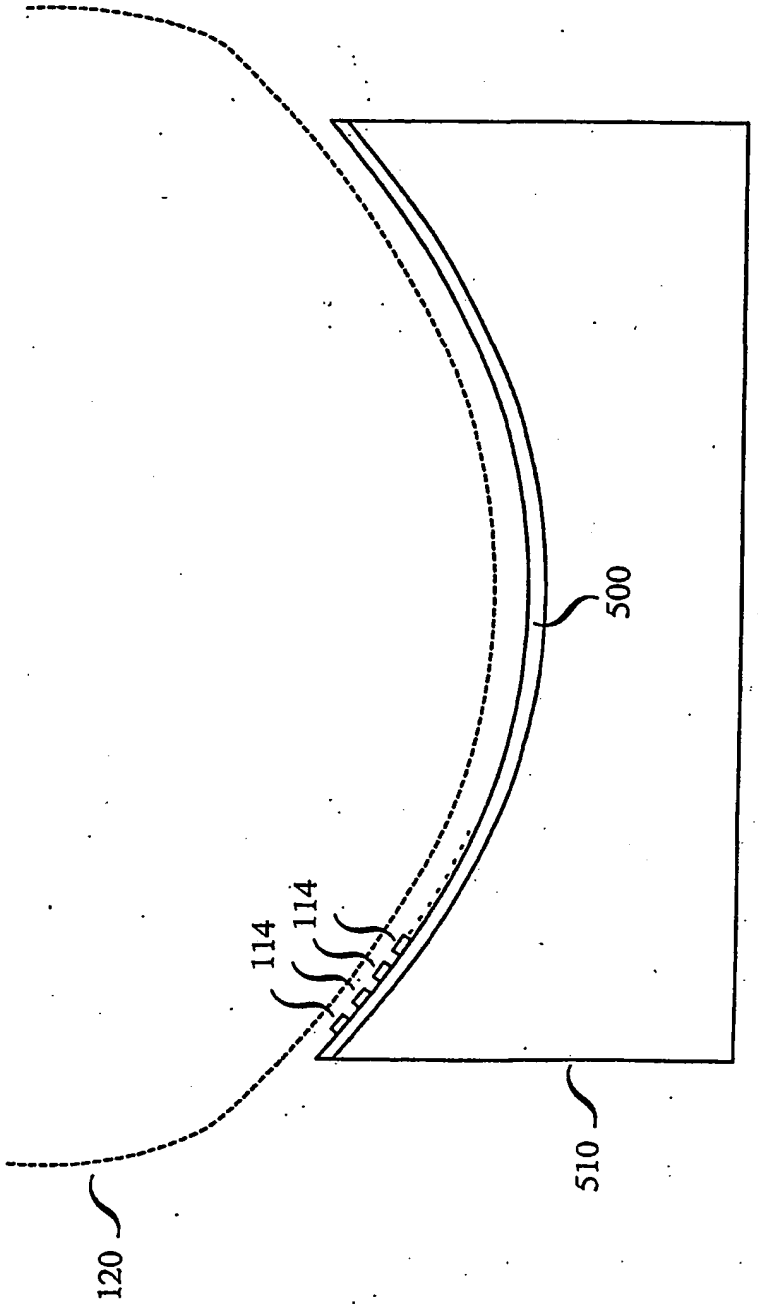


Figure 5

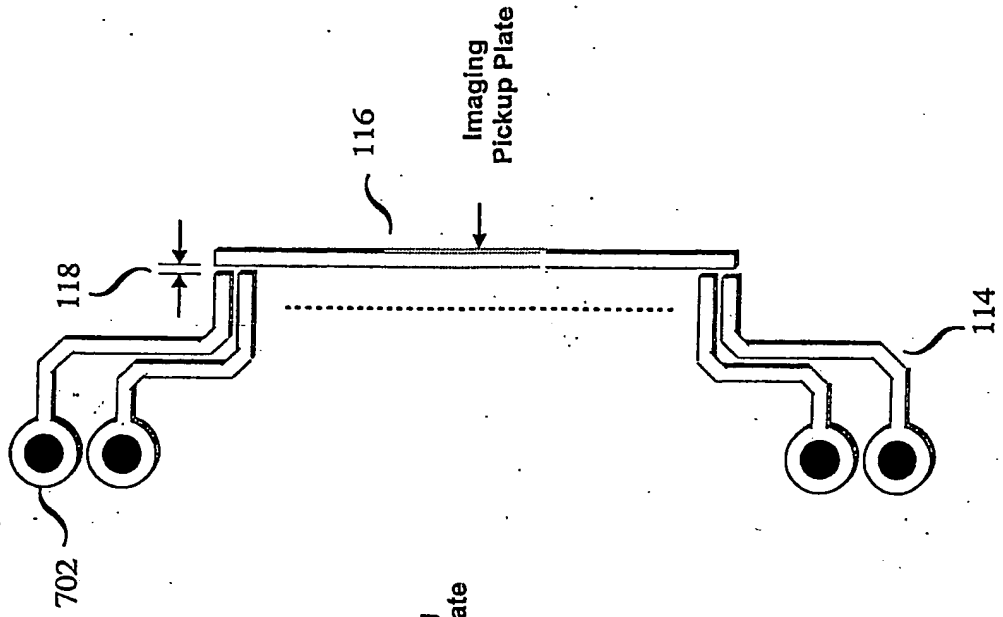


Figure 7

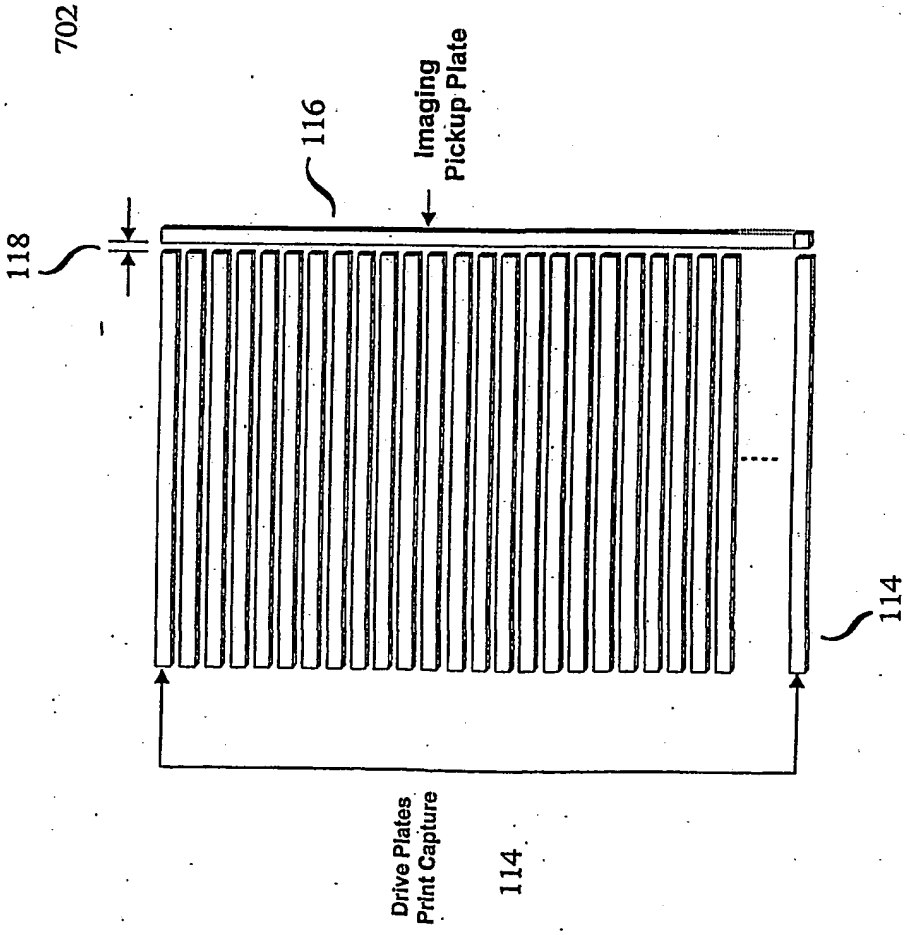


Figure 6

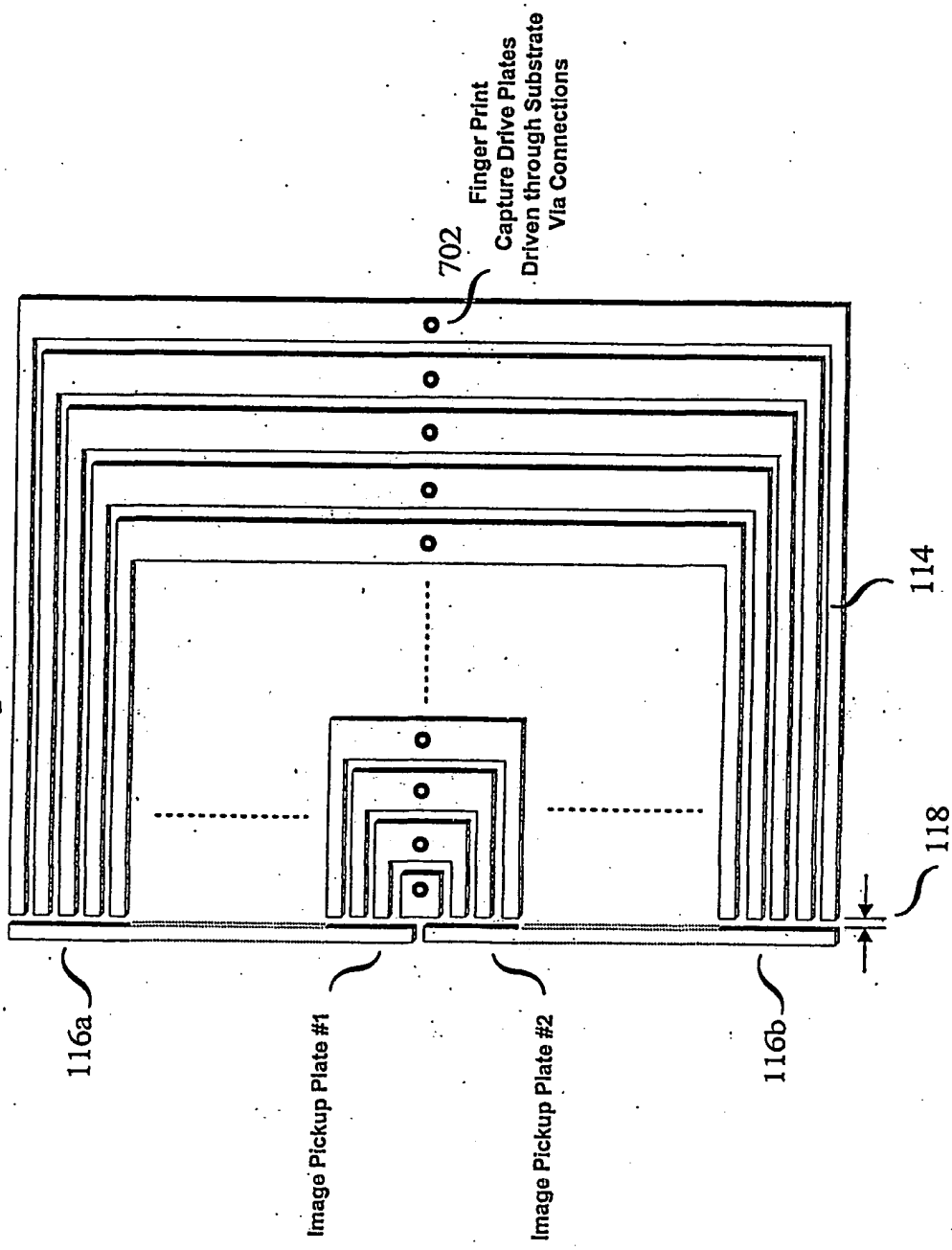

Finger Print
Capture Drive Plates
Driven through Substrate
Via Connections
702
114
118
116a
Image Pickup Plate #1
Image Pickup Plate #2
116b

Figure 8

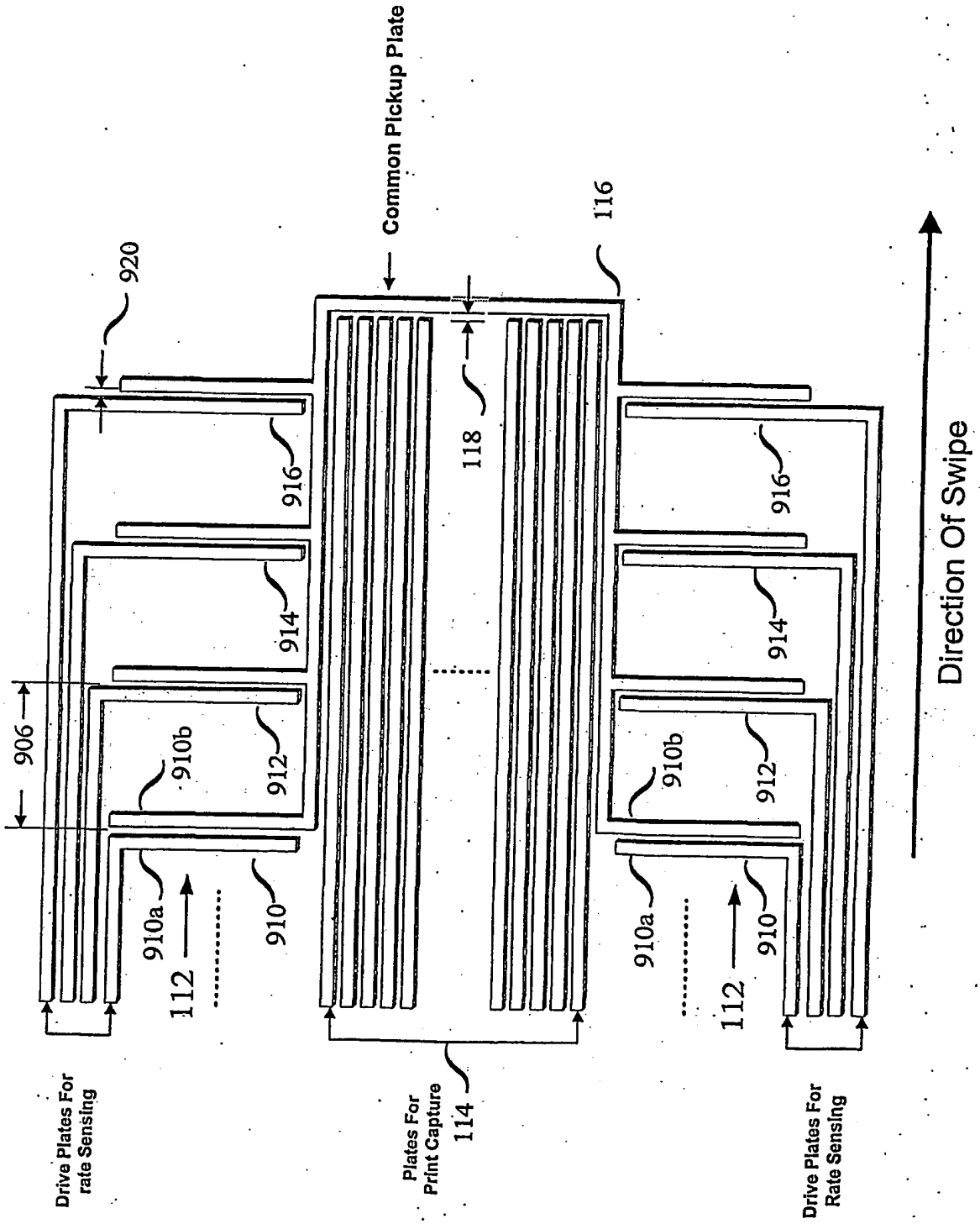

Common Pickup Plate
920
116
118
916
914
912
910b
910a
910
906
112
Drive Plates For rate Sensing
Plates For Print Capture
114
Drive Plates For Rate Sensing
Direction Of Swipe

Figure 9

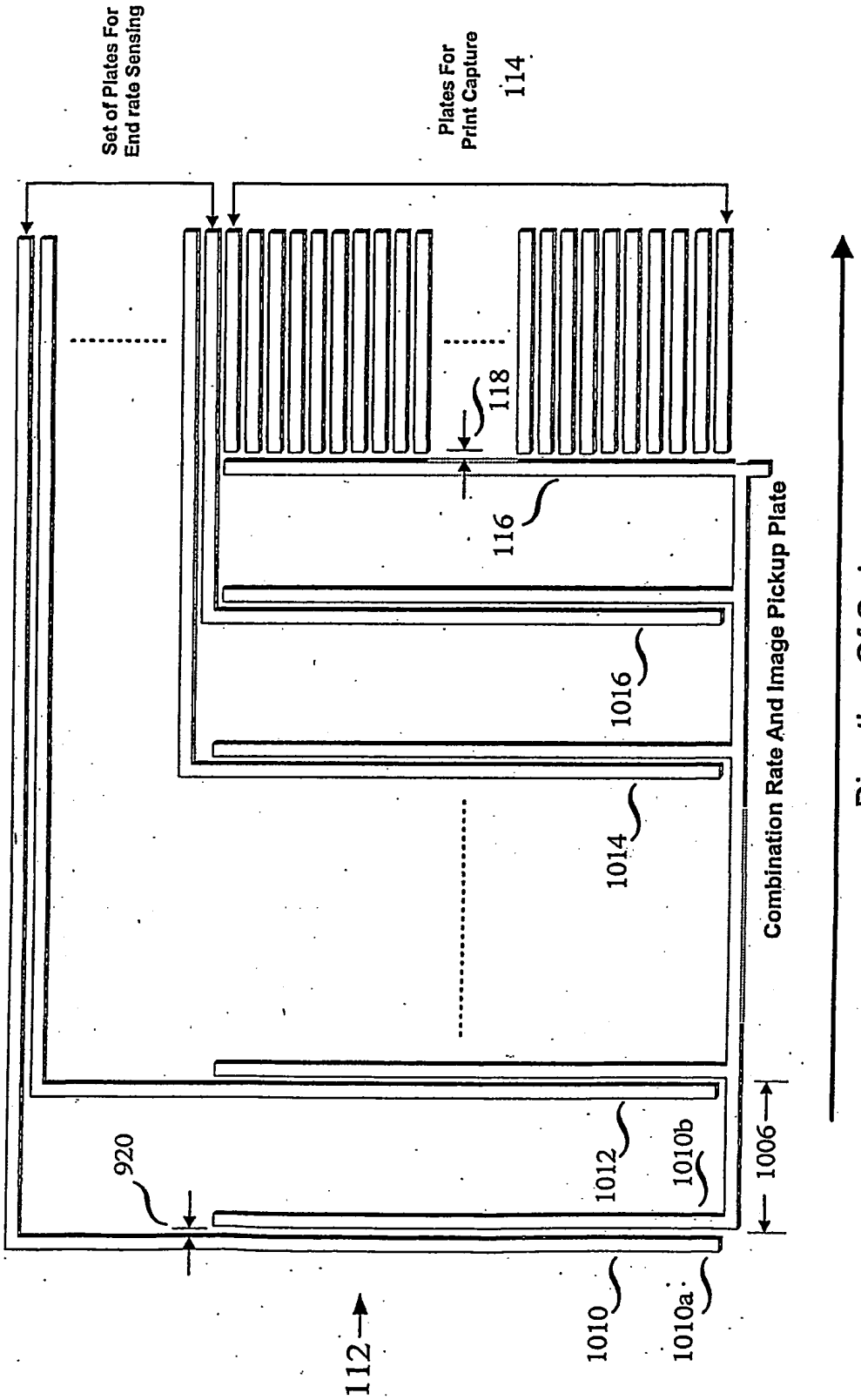

Set of Plates For End rate Sensing
Plates For Print Capture
114
118
116
1016
1014
Combination Rate And Image Pickup Plate
Direction Of Swipe
920
1012
1010b
1006
1010
1010a
112

Figure 10

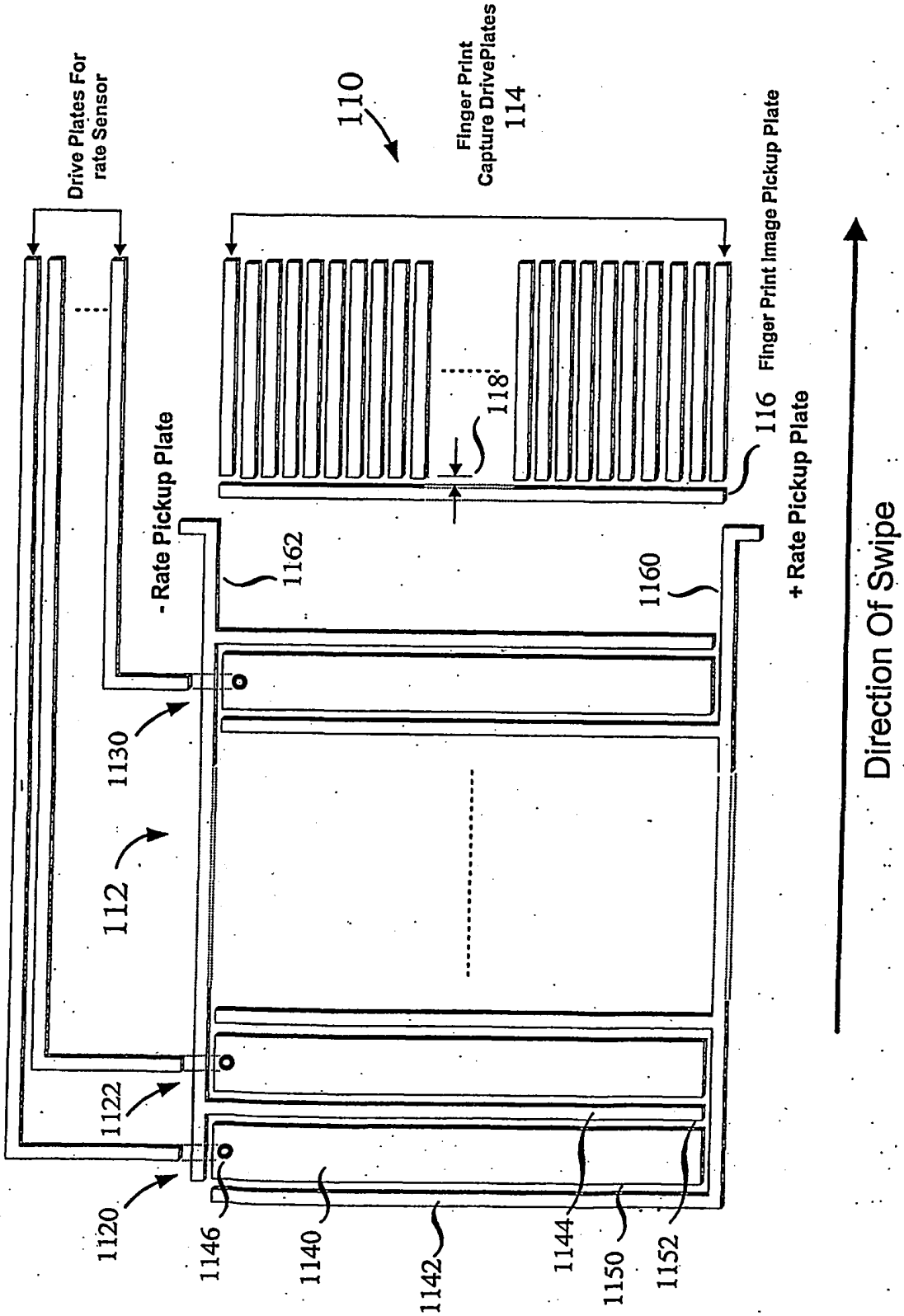

Drive Plates For rate Sensor
110
Finger Print Capture DrivePlates 114
Finger Print Image Pickup Plate
116
118
- Rate Pickup Plate
+ Rate Pickup Plate
1162
1160
1130
112
1122
1120
1146
1140
1142
1144
1150
1152
Direction Of Swipe

Figure 11

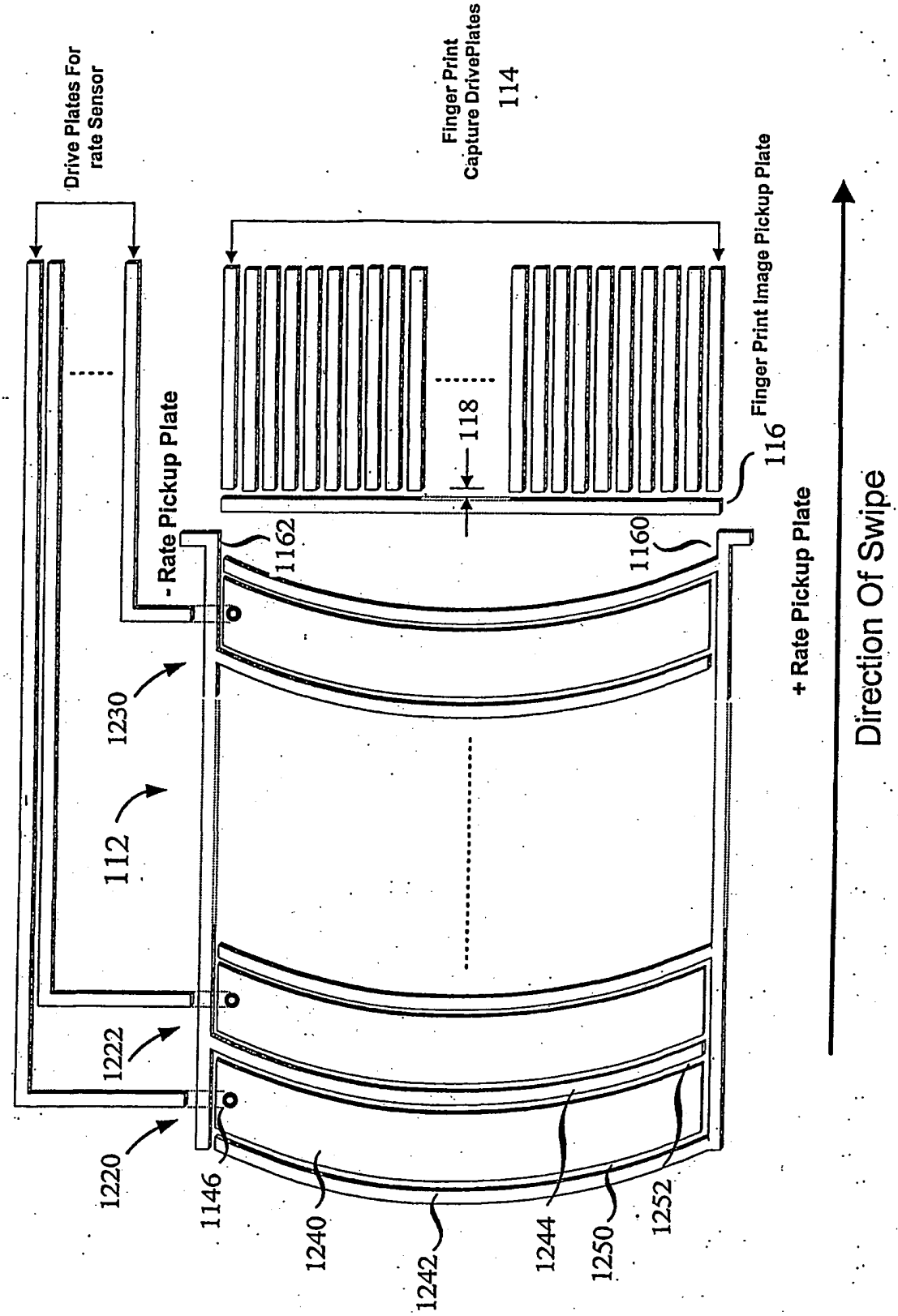

Drive Plates For rate Sensor
Finger Print Capture DrivePlates
114
Finger Print Image Pickup Plate
116
118
- Rate Pickup Plate
+ Rate Pickup Plate
Direction Of Swipe
1162
1160
1230
112
1222
1220
1146
1240
1242
1244
1250
1252

Figure 12

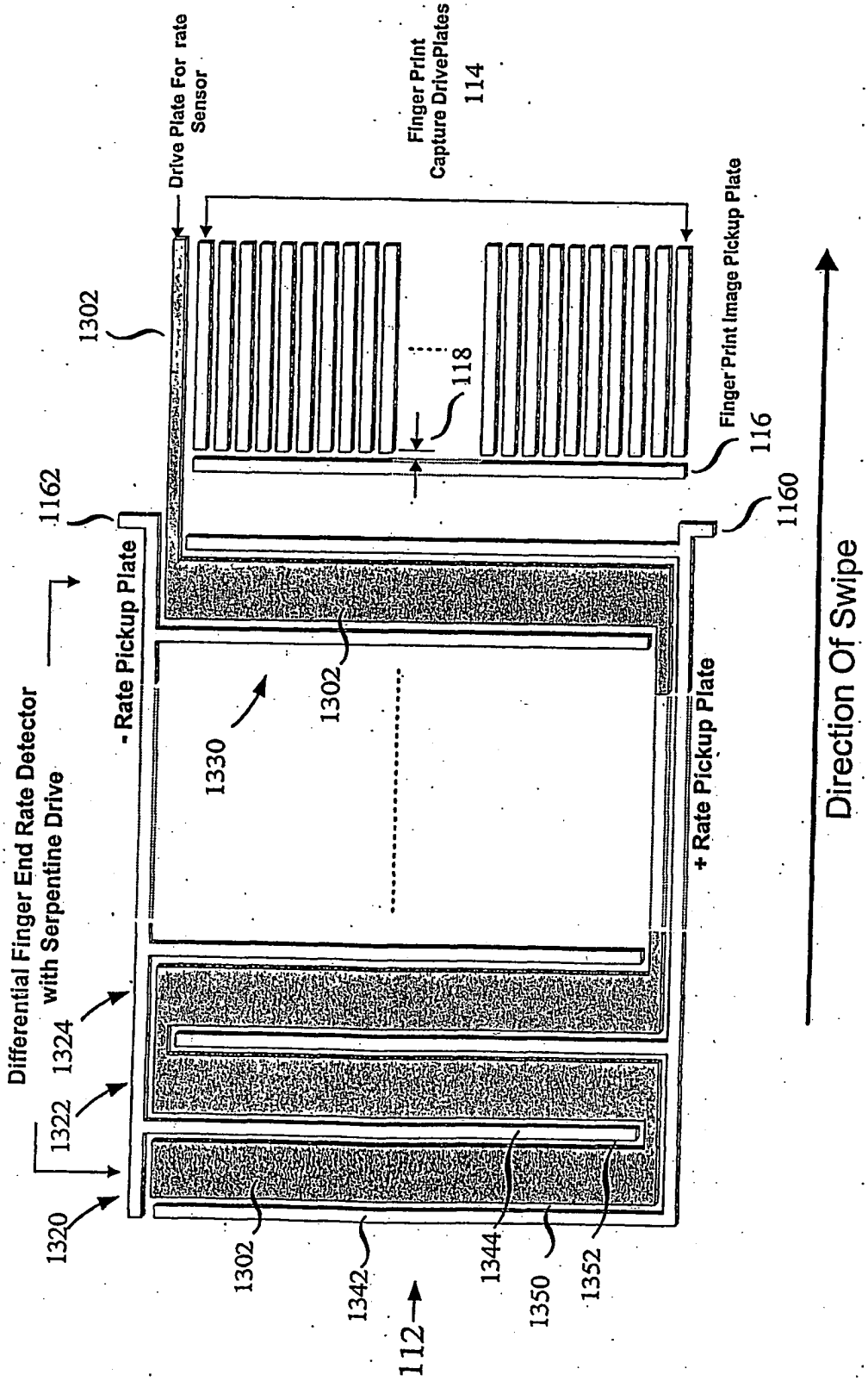


Figure 13

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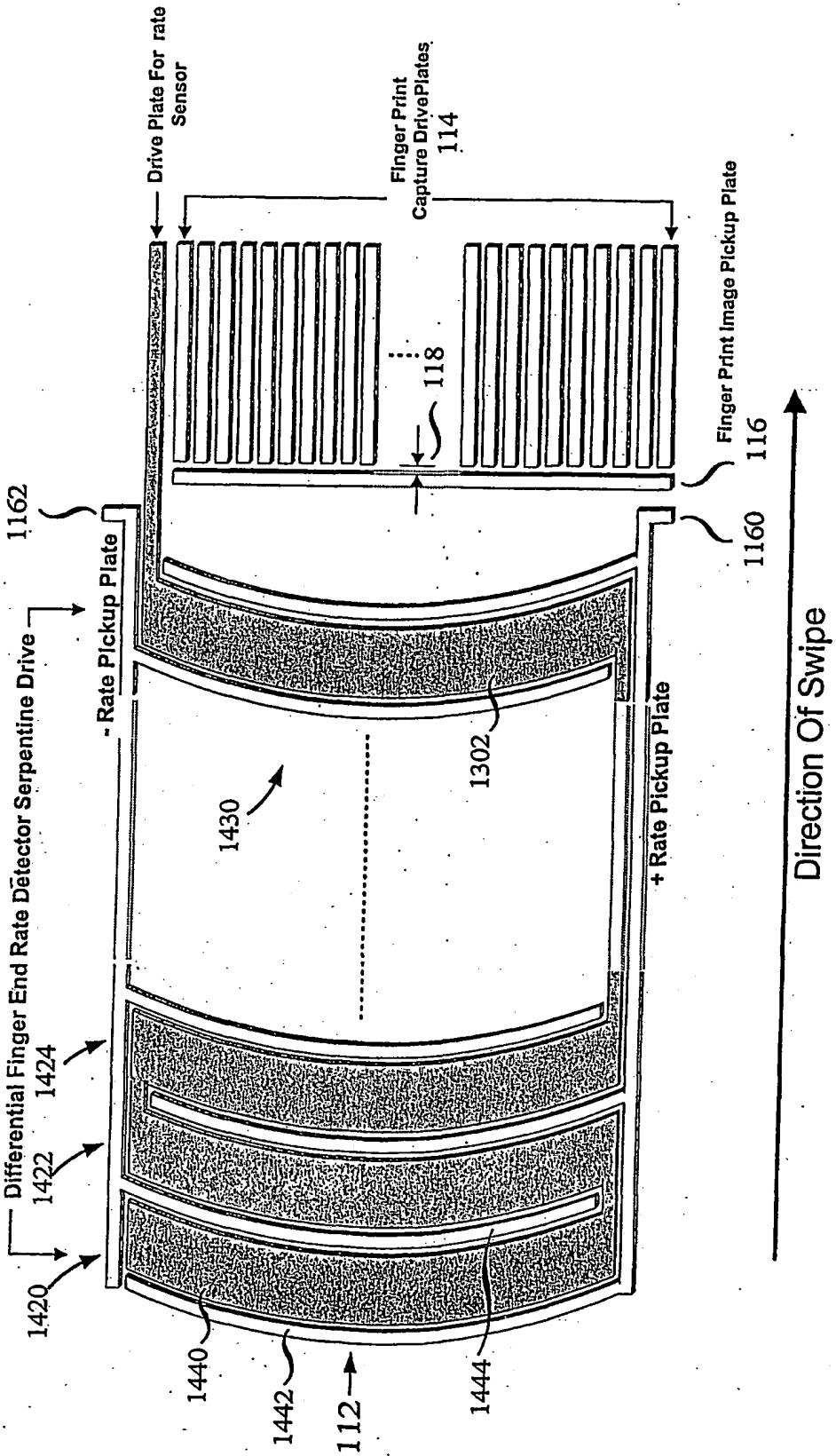


Figure 14

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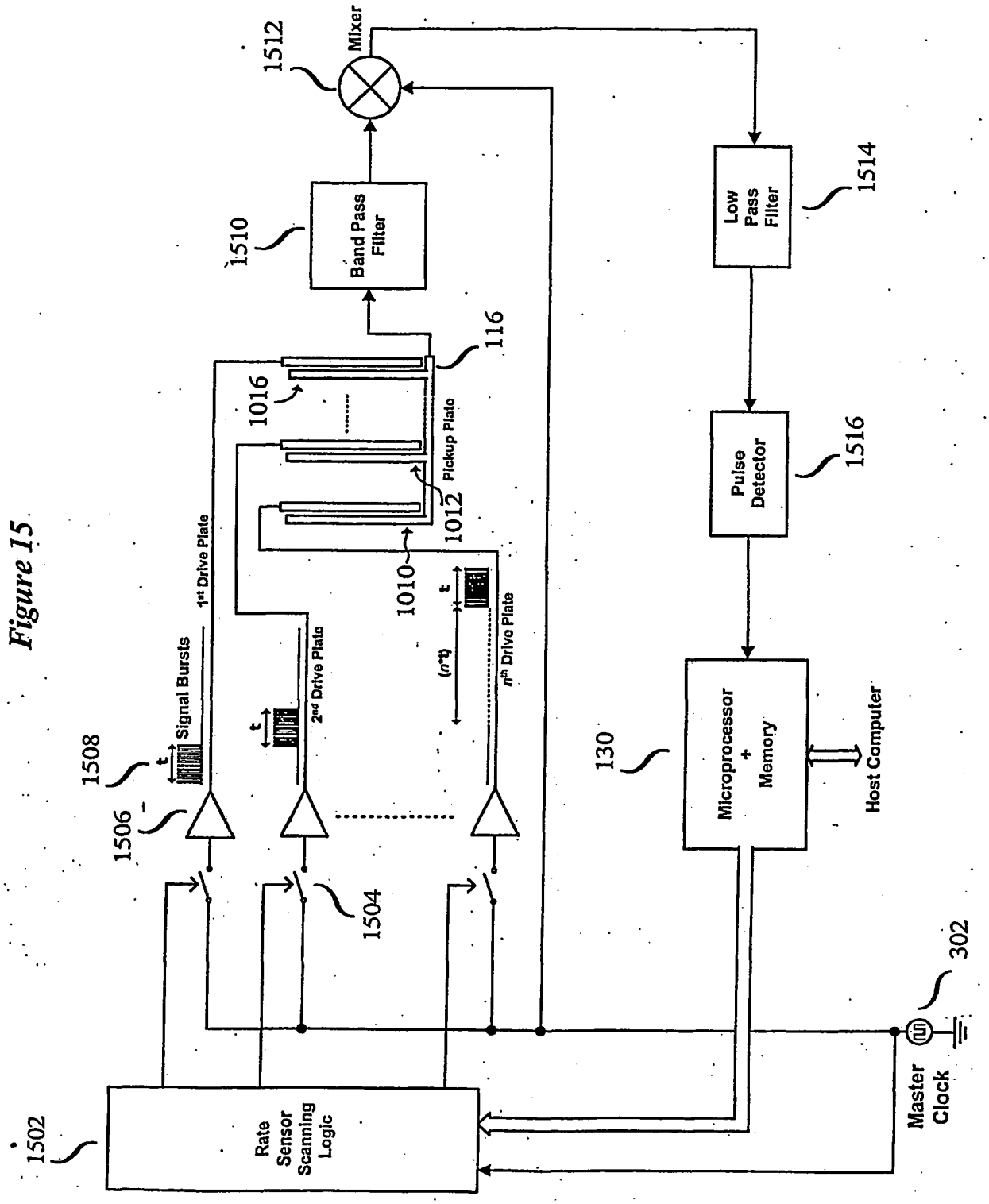

1512
Mixer
1510
Band Pass Filter
1514
Low Pass Filter
116
1016
Pickup Plate
1012
1010
1516
Pulse Detector
1st Drive Plate
2nd Drive Plate
nth Drive Plate
Signal Bursts
t
(n*t)
1508
1506
1504
130
Microprocessor + Memory
Host Computer
302
Master Clock
1502
Rate Sensor Scanning Logic

Figure 15

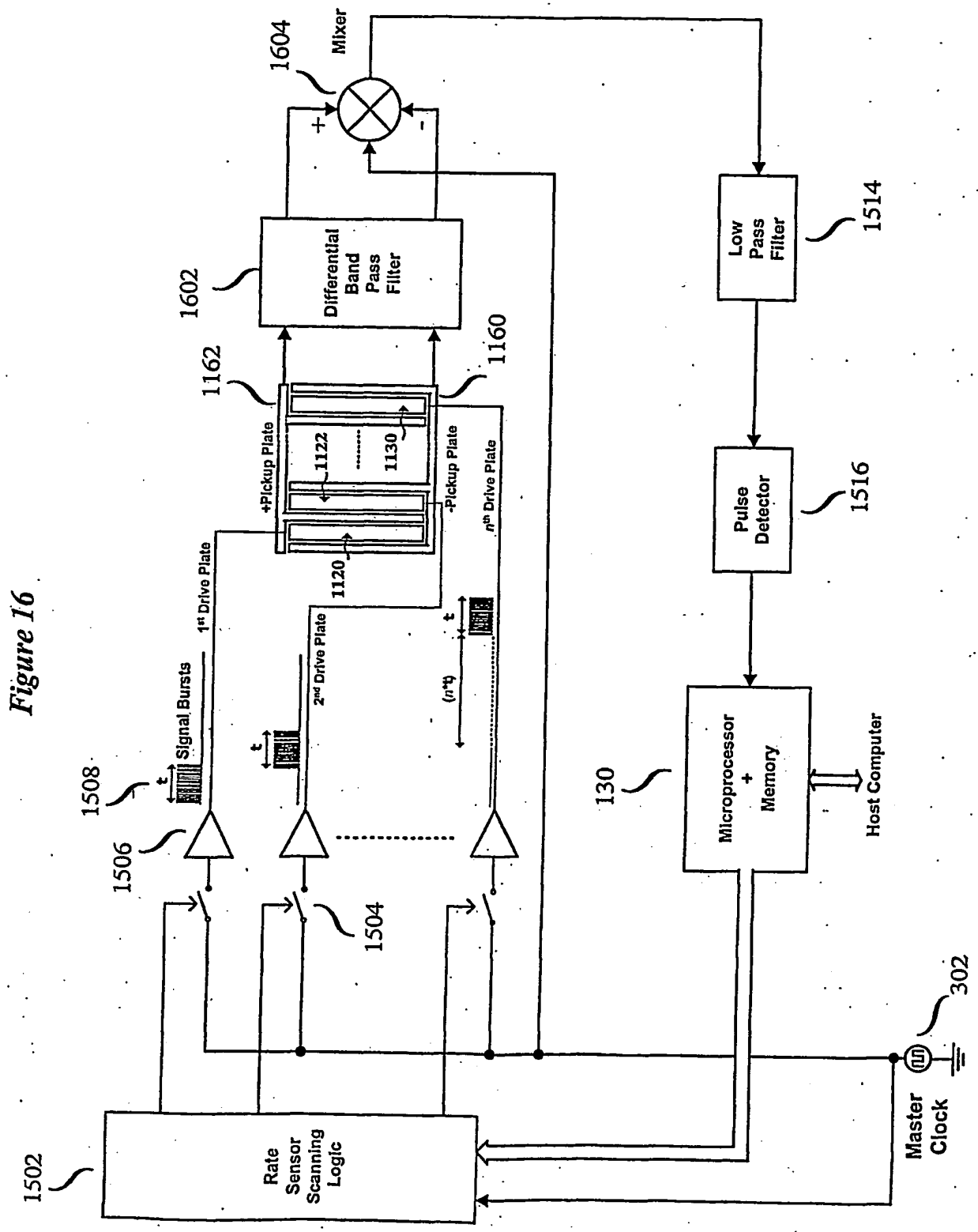

1604
Mixer
+
-
1602
Differential Band Pass Filter
1162
1160
+Pickup Plate
1122
1130
-Pickup Plate
n^th Drive Plate
1120
1st Drive Plate
2nd Drive Plate
Signal Bursts
t
(n*t)
1508
1506
1504
1514
Low Pass Filter
1516
Pulse Detector
130
Microprocessor + Memory
Host Computer
302
Master Clock
1502
Rate Sensor Scanning Logic

Figure 16

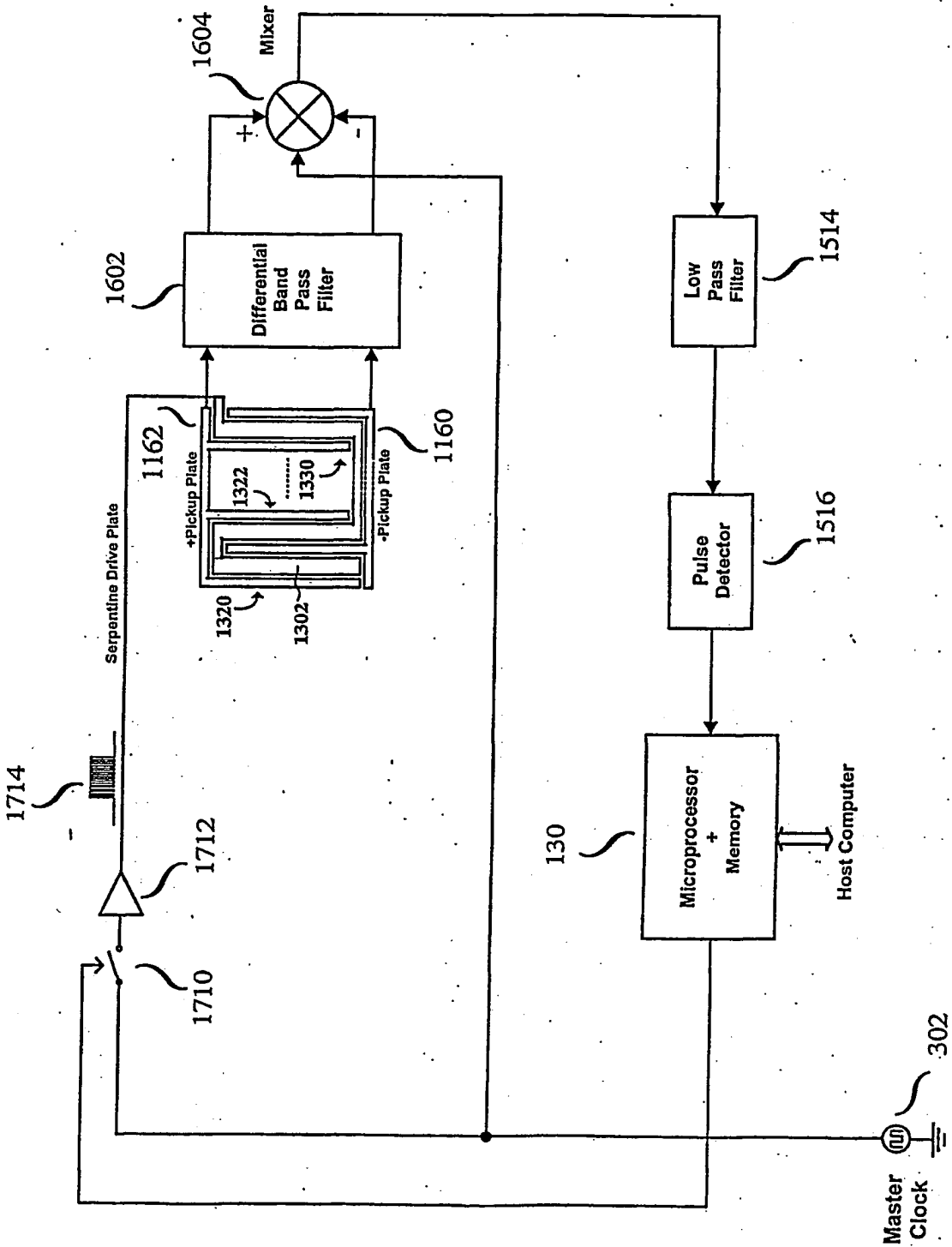

1604
Mixer
+
-
1602
Differential Band Pass Filter
1514
Low Pass Filter
1162
+Pickup Plate
1322
1330
1160
-Pickup Plate
Serpentine Drive Plate
1516
Pulse Detector
1320
1302
1714
1712
130
Microprocessor + Memory
Host Computer
1710
302
Master Clock

Figure 17

Figure 18

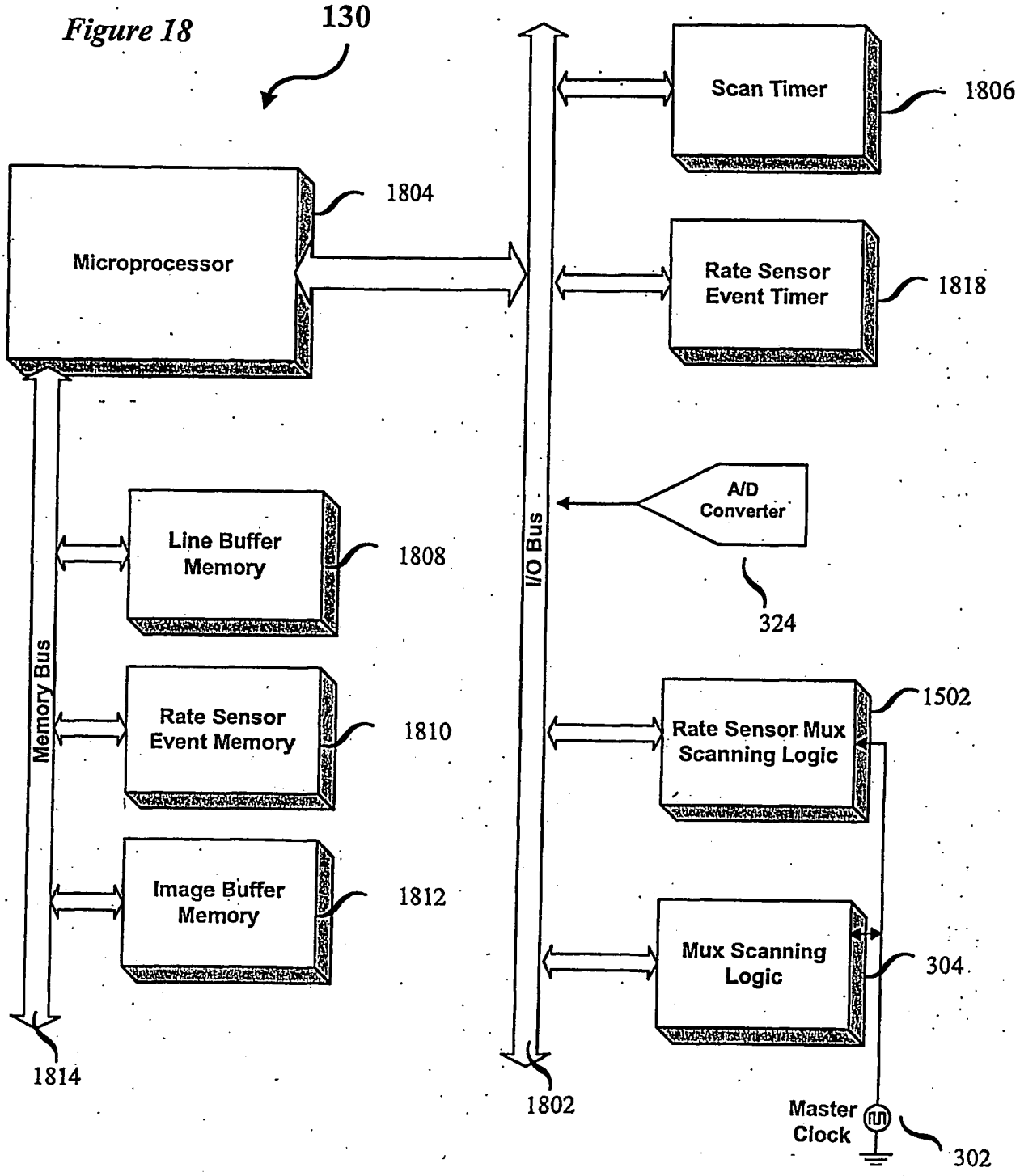

130
Scan Timer
1806
1804
Microprocessor
Rate Sensor Event Timer
1818
A/D Converter
324
Line Buffer Memory
1808
I/O Bus
Memory Bus
Rate Sensor Event Memory
1810
1502
Rate Sensor Mux Scanning Logic
Image Buffer Memory
1812
Mux Scanning Logic
304
1814
1802
Master Clock
302

Figure 19

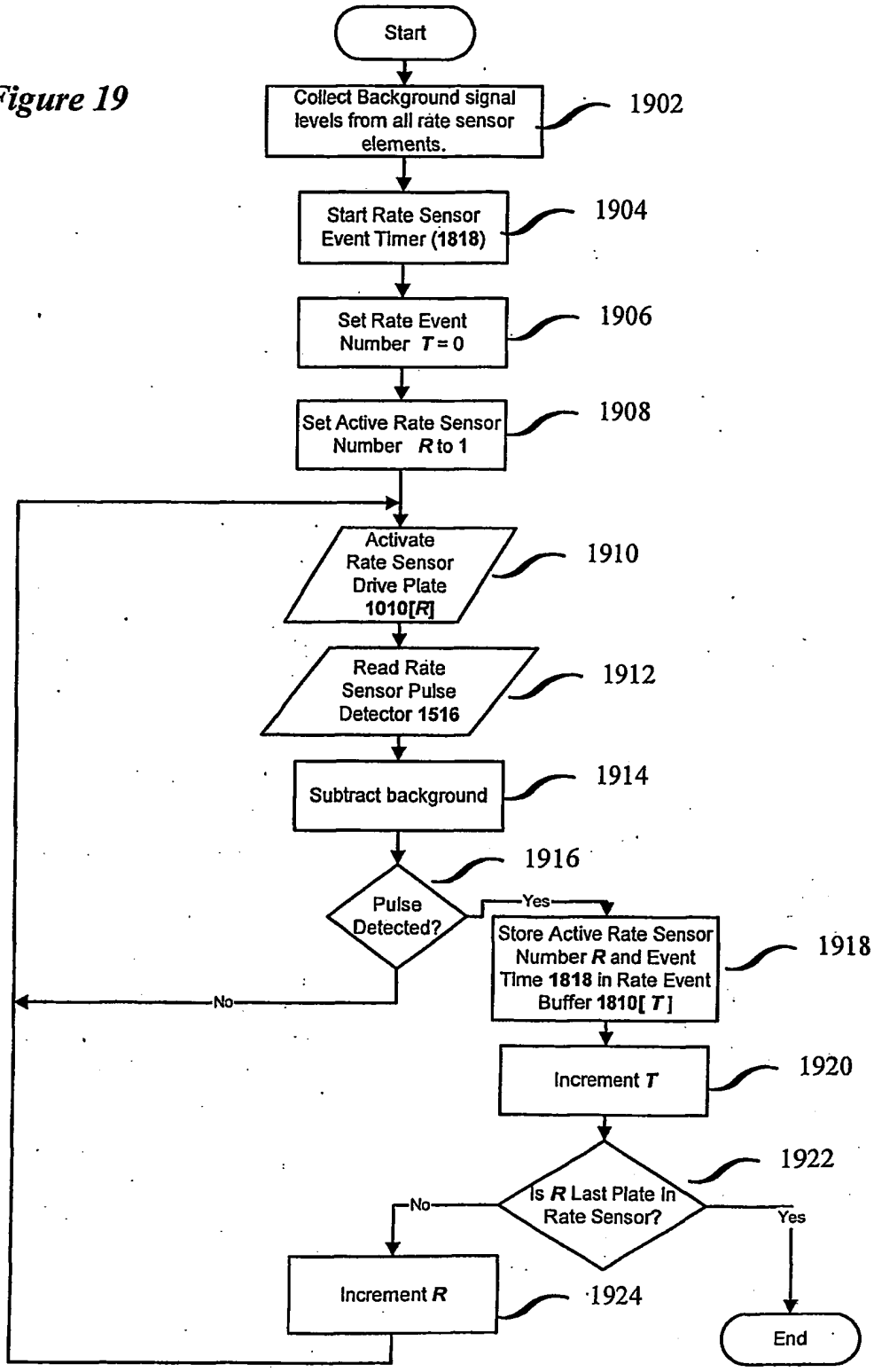

Start
Collect Background signal levels from all rate sensor elements.
1902
Start Rate Sensor Event Timer (1818)
1904
Set Rate Event Number T = 0
1906
Set Active Rate Sensor Number R to 1
1908
Activate Rate Sensor Drive Plate 1010[R]
1910
Read Rate Sensor Pulse Detector 1516
1912
Subtract background
1914
1916
Pulse Detected?
Yes
No
Store Active Rate Sensor Number R and Event Time 1818 in Rate Event Buffer 1810[T]
1918
Increment T
1920
1922
Is R Last Plate In Rate Sensor?
No
Yes
Increment R
1924
End

Figure 20

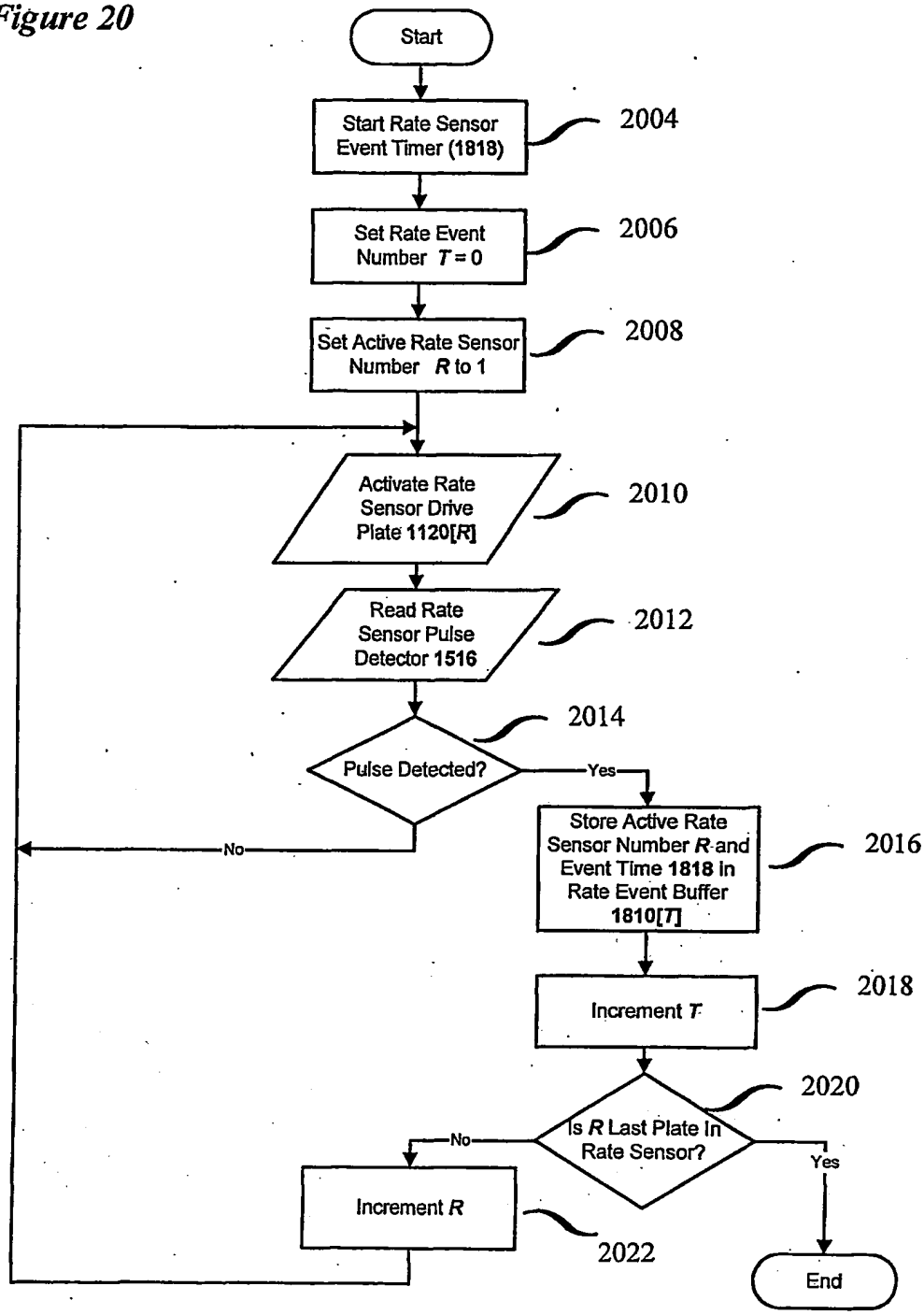
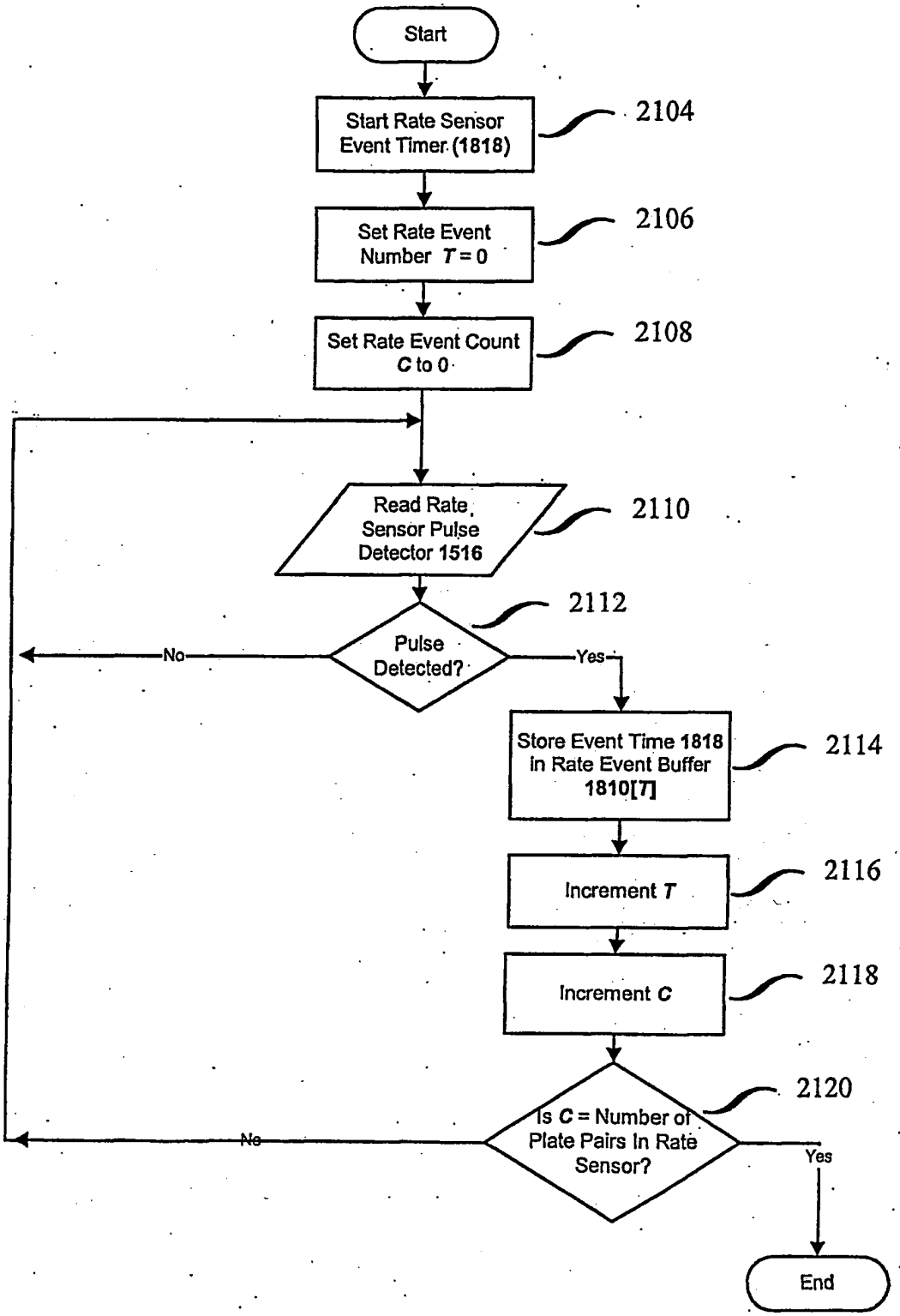

Start
Start Rate Sensor Event Timer (1818)
2004
Set Rate Event Number T = 0
2006
Set Active Rate Sensor Number R to 1
2008
Activate Rate Sensor Drive Plate 1120[R]
2010
Read Rate Sensor Pulse Detector 1516
2012
2014
Pulse Detected?
Yes
No
Store Active Rate Sensor Number R and Event Time 1818 in Rate Event Buffer 1810[T]
2016
Increment T
2018
2020
Is R Last Plate in Rate Sensor?
No
Yes
Increment R
2022
End

Figure 21



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Figure 22

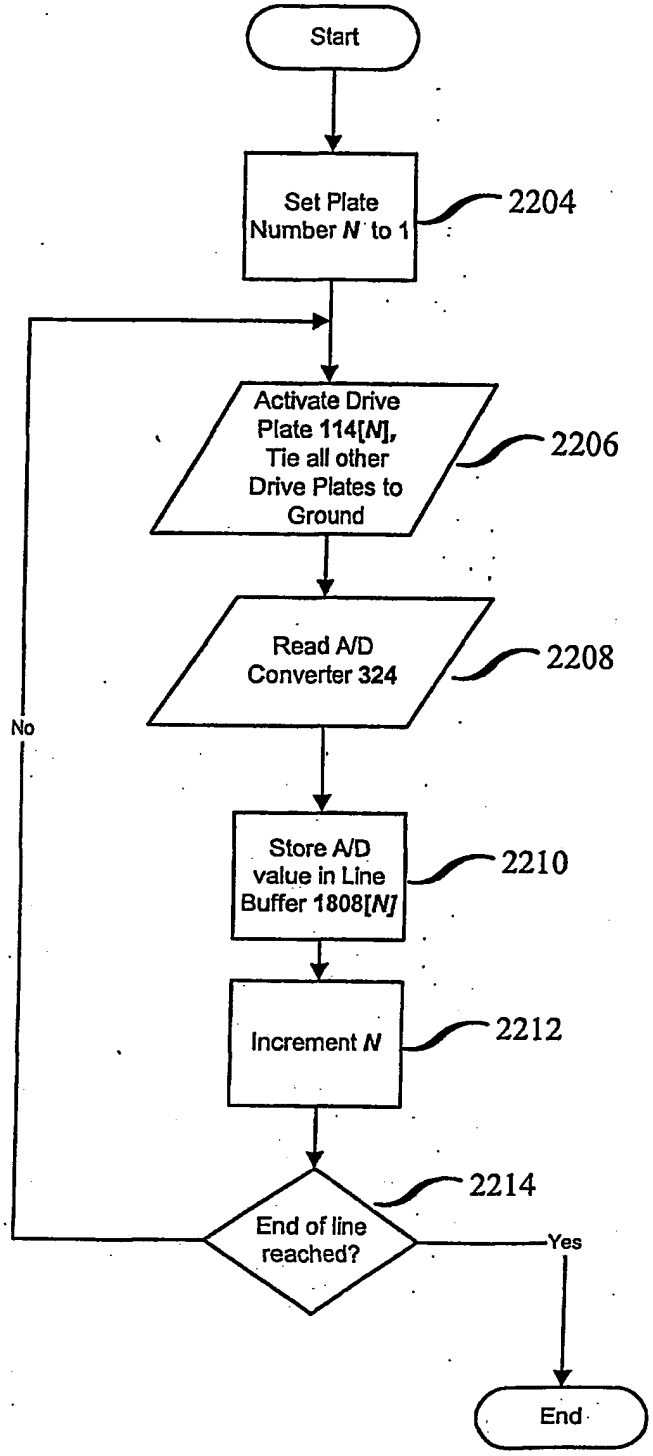

Start
Set Plate Number N to 1
2204
Activate Drive Plate 114[N], Tie all other Drive Plates to Ground
2206
Read A/D Converter 324
2208
Store A/D value in Line Buffer 1808[N]
2210
Increment N
2212
End of line reached?
2214
No
Yes
End

Figure 23

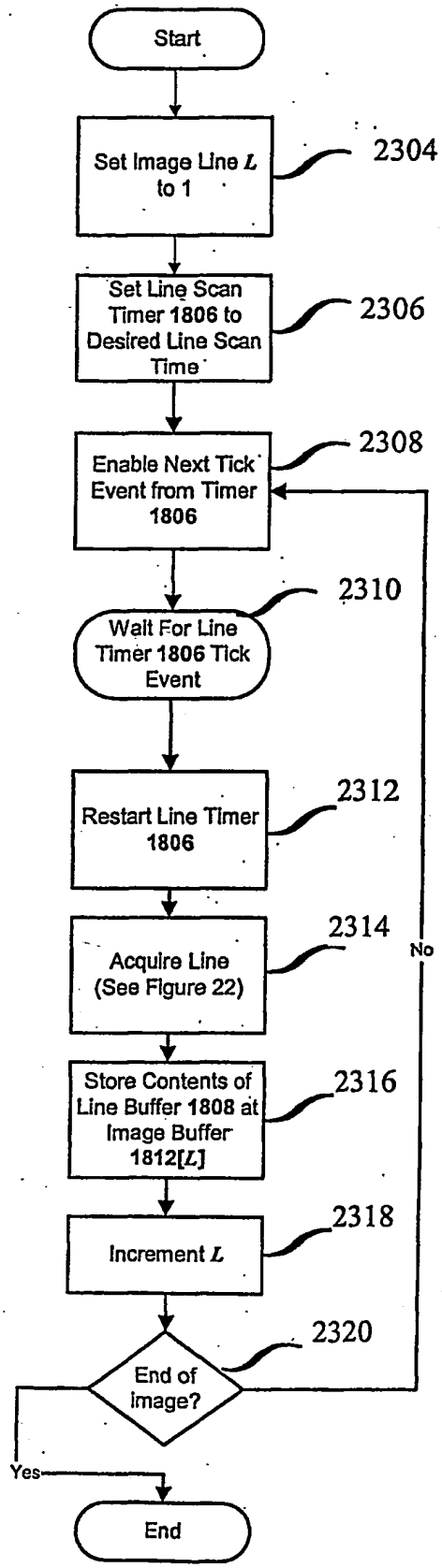
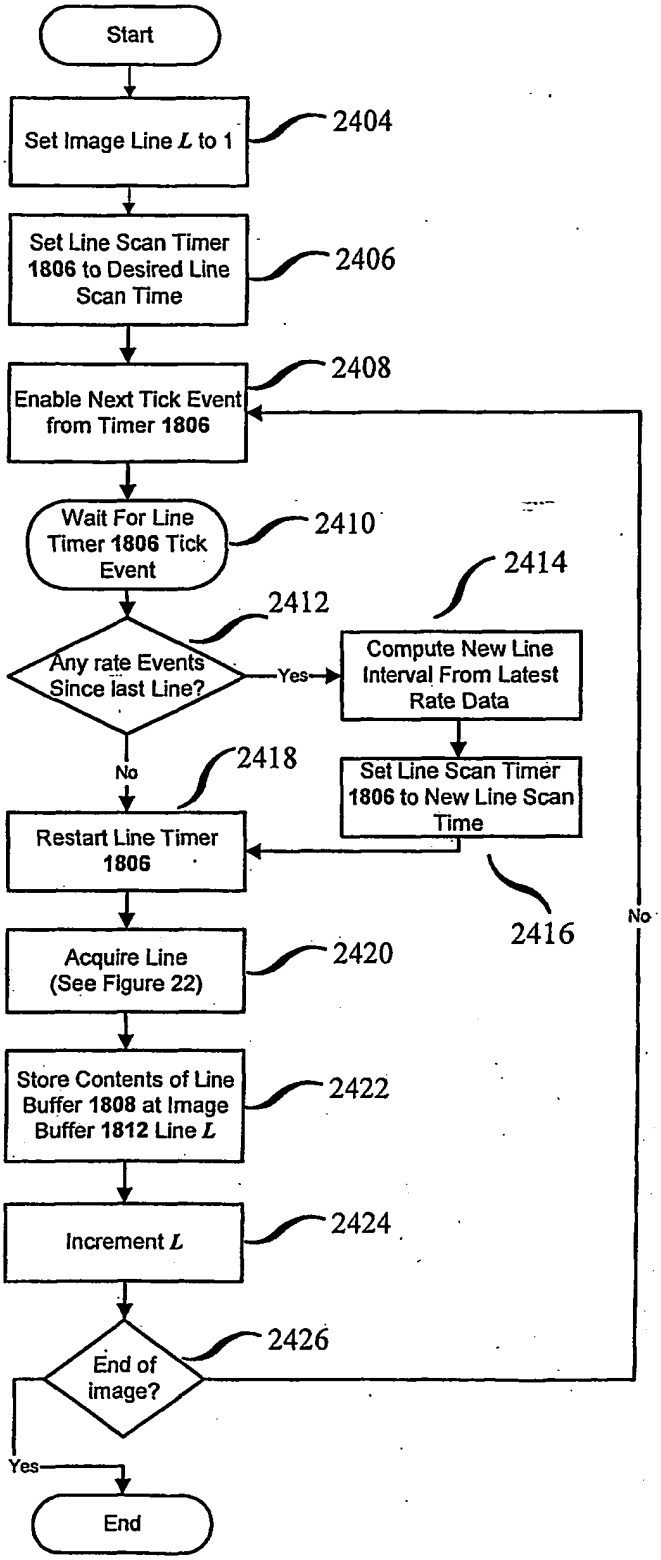

Start
Set Image Line L to 1
2304
Set Line Scan Timer 1806 to Desired Line Scan Time
2306
Enable Next Tick Event from Timer 1806
2308
Wait For Line Timer 1806 Tick Event
2310
Restart Line Timer 1806
2312
Acquire Line (See Figure 22)
2314
Store Contents of Line Buffer 1808 at Image Buffer 1812[L]
2316
Increment L
2318
End of Image?
2320
No
Yes
End

Figure 24


Start
Set Image Line L to 1
2404
Set Line Scan Timer 1806 to Desired Line Scan Time
2406
Enable Next Tick Event from Timer 1806
2408
Wait For Line Timer 1806 Tick Event
2410
2414
2412
Any rate Events Since last Line?
Yes
Compute New Line Interval From Latest Rate Data
No
2418
Set Line Scan Timer 1806 to New Line Scan Time
Restart Line Timer 1806
2416
No
Acquire Line (See Figure 22)
2420
Store Contents of Line Buffer 1808 at Image Buffer 1812 Line L
2422
Increment L
2424
End of image?
2426
Yes
End

PTO/SB/08a (08-03)
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Application Number	11274999
Filing Date	2005-11-15
First Named Inventor	J. Kurth REYNOLDS
Art Unit	2673
Examiner Name	
Attorney Docket Number	028.0013

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	Application Number	11274999
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	First Named Inventor	J. Kurth REYNOLDS
	Art Unit	2673
	Examiner Name	
	Attorney Docket Number	028.0013

	1	International Search Report for International Application No. PCT/US2006/040266, mailed March 30, 2007.	☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	11274999
	Filing Date	2005-11-15
	First Named Inventor	J. Kurth REYNOLDS
	Art Unit	2673
	Examiner Name	
	Attorney Docket Number	028.0013

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/S. Jared Pitts/	Date (YYYY-MM-DD)	2007-04-05
Name/Print	S. Jared Pitts	Registration Number	38579

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(11) EP 0 749 086 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
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(21) Application number: **95109292.3**

(22) Date of filing: **15.06.1995**

(84) Designated Contracting States:
DE ES FR GB IT PT

(71) Applicant: **Wacom Co., Ltd.**
Saitama, 349-11 (JP)

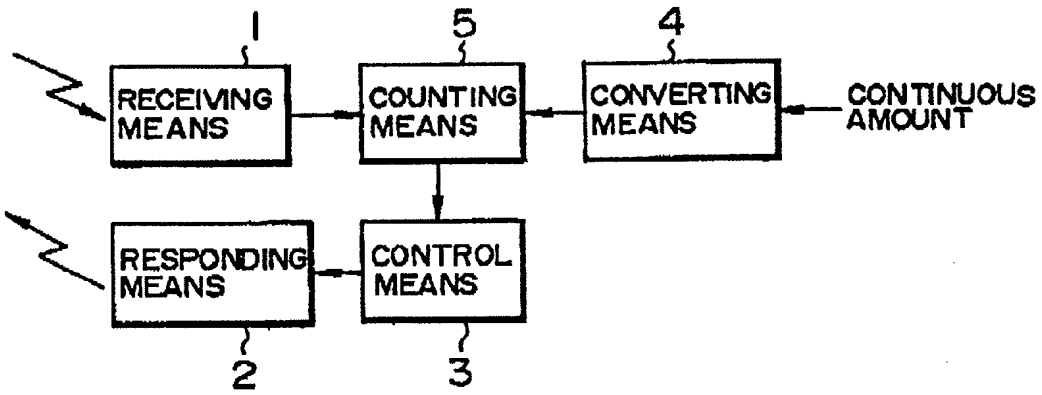
(72) Inventor: **Katsurahira, Yuji**
c/o Wacom Co,, Ltd.
Saitama, 349-11 (JP)

(74) Representative: **Müller, Enno, Dipl.-Ing.**
Corneliusstrasse 45
42329 Wuppertal (DE)

(54) Position pointing device

(57) A position pointing device performs coding of information corresponding to an operation expressed by continuous amount without using A/D converting circuit and transmits the coded information to a position detecting device. The information corresponding to operation expressed by a continuous amount is converted by a converting circuit (4) into time length. A counter (5) counts the number of waves of alternating electric, magnetic or electromagnetic field received by a receiving circuit (1) within the time length determined by the converting circuit (4), and performs binary coding of the counted value. A control circuit (3) controls a responding circuit (2) in accordance with the binary code so as to effect a change in alternating electric, magnetic or electromagnetic field which is sent back to the position detecting device. The information corresponding to operation expressed by continuous amount can be coded without requiring A/D converter which consumes large electric power.

FIG. 1



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Description

BACKGROUND OF THE INVENTION

Field of the Invention:

The present invention relates to an improvement in a position pointing device which is electromagnetically or electrostatically coupled with a position detecting device so as to be able to point a position on the position detecting device.

Description of the Related Arts:

Prior to the instant application, the applicant has proposed, in Japanese Patent Application No. 61-213970 (Japanese Patent Laid-Open No. 63-70326), a position detecting device in which a sensing section exchanges electric wave signal with a position pointing device so as to detect a position pointed by the position pointing device.

Briefly, the position detecting device disclosed in Japanese Patent Laid-Open No. 63-70326 has a plurality of loop coils constituting the sensing section and adapted to transmit an electric wave of a predetermined frequency. The electric wave is received by resonance circuit provided in the position pointing device so that resonance takes place in the resonance circuit to emit electric wave. This electric wave is received by the loop coil so that a voltage is inducted in the loop coil. This operation is conducted successively over the plurality of loop coils constituting the sensing section, so that the coordinate values of the position pointed by the position pointing device is detected based on the levels of the voltages induced in the loop coils.

The position detecting device of the type described faces a demand for abilty to enter various kinds of additional information in addition to the coordinate values of the pointed position, such as information which indicates that the pointing means, e.g., a pen or the like, has been set to a position for pointing a definite position (this state will be referred to as "pen-down state", hereinafter), information concerning the type of the pointing means, e.g., a pen, a cursor or the like, as well as a demand for inputting, together with the coordinate values, information for continuously varying values of parameters other than the coordinate information, such as, for example, thickness or width of a line and hue or density (brightness) of the position or area appointed by the pointing device.

To cope with such demands, the position pointing device disclosed in Japanese patent Laid-Open No. 63-70326 employs a manual switch which selectively connects, to the resonance circuit which is constituted by a coil and a capacitor, an additional capacitor so as to slightly vary the resonance frequency, the slight variation in the resonance frequency being detected as a variation in the phase angle so as to be used as information indicative of the pen-down state or the type of the pointing means.

In Japanese Patent Application No. 62-208293 (Japanese Patent Laid-Open No. 64-53223), the applicant also proposed a position pointing device having a resonance circuit including a coil the inductance of which continuously varies according to the pen pressure, so that the resonance frequency continuously varies according to the pen pressure, the linear change in the resonance frequency being detected as a continuous change in the phase angle so as to be used as information for linearly varying the parameter.

Thus, in these known position pointing device, information is obtained in the form of a change in the phase angle This type of device essentially requires that the range over which the resonance frequency of the resonance circuit varies as a result of operation of a manual switch or change in the pen pressure precisely coincides with a certain range which is centered at the frequency of the electric wave transmitted from the sensing section. A laborious adjusting work is required to attain such a matching of the frequency range. In addition, the detectable range of phase angle is limited to be from about -60° to about +60°. Furthermore, a certain tolerance for the phase angle to be detected has to be set in order to accommodate any change in the inductance of the coil and capacitance of the capacitor of the resonance circuit caused by a change in the ambient temperature. For these reasons, the number of kinds of information which can be entered is undesirably limited.

Under this circumstance, the same applicant proposed, in Japanese Patent Application No. 1-327276 (Japanese Patent Laid-Open No. 3-189716), a combination of a position detecting device and a position pointing device. In this art, the position pointing device incorporates a resonance circuit which includes a power supply circuit capable of extracting electric energy from a voltage induced, and a code generator activated by the extracted electric energy and capable of generating binary code of a plurality of bits in accordance with an operation of a switch. In operation, an additional capacitor or capacitors are connected to or disconnected from the coil and the capacitor of the resonance circuit by functioning of an electronic switch in accordance with the binary code, so that the resonance frequency is slightly varied in accordance with the binary code. The slight variation of the resonance frequency corresponding to the binary code is detected as a change in the phase angle, and the phase angle thus detected is transformed into the binary code, whereby a plurality of kinds of information corresponding to the bit number of the binary codes are entered.

As in the case of the art disclosed in Japanese Patent Laid-Open No. 64-53223, the device shown in Japanese Patent Laid-Open No. 3-189716, for the purpose of entering information concerning operation expressed by a continuous amount, e.g., pen pressure, still relies upon a linear change in the resonance frequency presented in accordance with the change in the pen pres-

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sure. This is attributable to the following reason.

In general, coding of information concerning an operation expressed by an amount which varies continuously, i.e., in a non-discrete manner, essentially requires an analog-to-digital (A/D) converting circuit. A/D converter circuits which are now commercially available consume large electric power and, hence, cannot suitably be used in a device such as that disclosed in Japanese Patent Laid-Open No. 189716 in which circuits are driven with small electric energy derived from an electric wave transmitted from the sensing section. It would be possible to overcome this problem by using batteries as auxiliary power supply but such a solution is impractical since the batteries will be exhausted shortly to require frequent renewal or recharging. This is the reason why the continuous change in the resonance frequency is employed as the sign of change in the parameter such as the pen pressure.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to provide a position pointing device in which information concerning an operation expressed by a continuous amount is coded without aid of A/D converting circuit and then transmitted to a position detecting device.

Another object of the present invention is to provide a position pointing device in which information concerning operation expressed by a continuous amount is coded and transmitted to a position detecting device, wherein requirement for auxiliary power supply such as batteries is completely eliminated or, when such auxiliary power supply is used, requirement for frequent renewal or recharging of batteries is reduced.

Still another object of the present invention is to provide a position pointing device in which a plurality of kinds of information concerning operations expressed by continuous amounts are coded without aid of A/D converting circuit and then transmitted to a position detecting device.

A further object of the present invention is to provide a position pointing device in which a plurality of kinds of information concerning operations expressed by continuous amounts are coded and transmitted to a position detecting device, wherein requirement for auxiliary power supply such as batteries is completely eliminated or, when such an auxiliary power supply is used, requirement for frequent renewal or recharging of batteries is reduced.

To these ends, according to one aspect of the present invention, there is provided a position pointing device, comprising: receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated from a position detecting device; responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to the position detecting device; control means for controlling the responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in the alternating electric, magnetic or electromagnetic field to be sent back to the position detecting device; converting means for converting the information corresponding to the operation into a time length; and counting means for counting the number of waves of the alternating electric, magnetic or electromagnetic field of the predetermined frequency received within the time length determined by the converting means and for binary-coding the counted value.

The above and other objects, features and advantages of the present invention will become clear from the following description when the same is read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram illustrative of a basic form of the position pointing device in accordance with the present invention;

Fig. 2 is a block diagram illustrative of another basic form of the position pointing device in accordance with the present invention;

Fig. 3 is a block diagram illustrative of still another basic form of the position pointing device in accordance with the present invention;

Fig. 4 is a block diagram illustrative of a further basic form of the position pointing device in accordance with the present invention;

Fig. 5 is a block diagram illustrative of a still further basic form of the position pointing device in accordance with the present invention;

Fig. 6 is a block diagram illustrative of a yet further basic form of the position pointing device in accordance with the present invention;

Fig. 7 is a block diagram illustrative of a yet further basic form of the position pointing device in accordance with the present invention;

Fig. 8 is a block diagram illustrative of an embodiment of the position pointing device in accordance with the present invention;

Fig. 9 is a circuit diagram illustrative of the construction of an example of a continuous signal detecting circuit incorporated in the embodiment shown in Fig. 8;

Fig. 10 is an illustration of waveforms of signals obtained at various portions of the circuit shown in Fig. 9;

Fig. 11 is a circuit diagram illustrative of the construction of an example of a pen-pressure/time converting means incorporated in the embodiment shown in Fig. 8;

Fig. 12 is an illustration of waveforms of signals obtained at various portions of the circuit shown in Fig. 11;

Fig. 13 is an illustration of waveforms of signals obtained at various portions of the embodiment

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shown in Fig. 8;

Fig. 14 is a circuit diagram showing a practical example of the circuit of the embodiment shown in Fig. 8;

Fig. 15 is a block diagram illustrative of the construction of another embodiment of the position pointing device in accordance with the present invention;

Fig. 16 is an illustration of an example of a resonance circuit incorporated in the embodiment shown in Fig. 15;

Fig. 17 is an illustration of an example of a timing extracting circuit incorporated in the embodiment shown in Fig. 15;

Fig. 18 is an illustration of waveforms of signals obtained at various portions of the circuit shown in Fig. 17;

Fig. 19 is an illustration of an example of a continuous signal detecting circuit incorporated in the embodiment shown in Fig. 15;

Fig. 20 is an illustration of waveforms of signals obtained at various portions of the circuit shown in Fig. 19;

Fig. 21 is an illustration of the construction of a continuous amount/time converting circuit incorporated in the embodiment shown in Fig. 15;

Fig. 22 is an illustration of waveforms of signals obtained at various portions of the circuit shown in Fig. 21; and

Fig. 23 is an illustration of waveforms of signals obtained at various portions of the embodiment shown in Fig. 15.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Before turning to the description of preferred embodiments, a description will be given of various basic forms of the present invention.

Fig. 1 shows a block diagram showing a basic form of the position pointing device of the present invention. The position pointing device in accordance with this basic form of the invention has a receiving means 1 for receiving an alternating electric field, an alternating magnetic field or an alternating electromagnetic field of a predetermined frequency radiated from a position detecting device which is not shown. The device also has a responding means 2 which sends an alternating electric field, an alternating magnetic field or an alternating electromagnetic field of any desired frequency back to the position detecting device. The device also has a control means which controls the responding means 2 in accordance with a binary code indicative of information corresponding to an operation, so as to cause a change in the alternating electric field, alternating magnetic field or the alternating electromagnetic field sent back to the position detecting device. The position pointing device further has a converting means 4 for converting information corresponding to operation expressed by a continuous amount into time length, and counting means 5 for counting the number of waves of the alternating electric, magnetic or electromagnetic field received within the time output from the converting means 4 and for converting the number of the waves into a binary code.

In the present invention, in order to detect the information corresponding to an operation expressed by a continuous amount, the converting means 4 preferably is formed of an element whose characteristics linearly or continuously vary in accordance with a change in the signal input thereto. More preferably, the converting means 4 includes a time constant circuit having a passive element, i.e., an element which linearly or continuously varies its characteristic such as resistance, inductance or capacitance.

Preferably, the receiving means 1 and the responding means 2 make use of a resonance circuit, in order to achieve high efficiency of receipt of the alternating electric, magnetic or electromagnetic field from the position detecting device, as well as high efficiency of sending of the alternating electric, magnetic or electromagnetic field back to the position detecting device. When such a resonance circuit is used, the arrangement is preferably such that the resonance characteristics of the resonance circuit is variable by the control means 3 so as to cause a change in the alternating electric, magnetic or electromagnetic field sent back to the position detecting device. It is also preferred that a power extracting means are provided for extracting, from the alternating electric, magnetic or electromagnetic wave received by the resonance circuit, electrical power used for driving various circuits in the position pointing device.

It is also preferred that the responding means 2 is operated in synchronization with the operation of the position detecting device so that the information corresponding to an operation expressed by a continuous amount is efficiently transmitted to the position detecting device.

Fig. 2 shows another basic form of the position pointing device of the present invention which can cope with the aforesaid demands. In this Figure, the reference numerals which are the same as those appearing in Fig. 1 denote the same parts or components as those of the basic form of the invention shown in Fig. 1. Thus, numeral 2 denotes responding means, 4 denotes converting means, and 5 denotes counting means. Numeral 6 designates receiving means which receives alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated at predetermined timings from the position detecting device, 7 denotes timing extracting means which extracts the above-mentioned predetermined timings from the alternating electric, magnetic or electromagnetic field, and 8 denotes control means which controls, at a preselected timing determined based on the above-mentioned predetermined timings, the responding means 2 in accordance with a binary code representative of information corresponding to the operation, thereby causing a change in

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the alternating electric, magnetic or electromagnetic field which is to be sent back to the position detecting device.

In the preset invention, in order to realize a time sharing between the receiving of the alternating electric, magnetic or electromagnetic field radiated from the position detecting device and the sending of the alternating electric, magnetic or electromagnetic field back to the position detecting device, the radiation of the alternating electric, magnetic or electromagnetic field from the position detecting device is conducted intermittently at a predetermined period such that a predetermined duration of radiation is followed by a predetermined period of suspension, and the responding means 2 is controlled in synchronization with the suspension of the radiation of the alternating electric, magnetic or electromagnetic field from the position detecting device.

Furthermore, in the present invention, it is also preferred that a time sharing can be realized between the detection of the coordinate values of the pointed position in the position detecting device and the transmission of information corresponding to operation expressed by the continuous amount. To this end, the radiation of the alternating electric, magnetic or electromagnetic field at a predetermined frequency from the position detecting device is preferably conducted continuously for a predetermined period or longer, followed by an intermittent radiation conducted at a repetition period sufficiently shorter than the predetermined period of the continuous radiation and with a predetermined duration. In this case, the responding means 2 is controlled in synchronization with thesuspension or termination of the radiation during the intermittent radiation which is conducted after the continuous radiation performed for the predetermined period or longer time.

In the present invention, it is also preferred that a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts are transmitted to the position detecting device.

Fig. 3 shows still another basic form of the position pointing device in accordance with the present invention which copes with the above-described demand. In this Figure, the same reference numerals as those appearing in Fig. 1 denote the same parts or components as those used in the basic form of the invention shown in Fig. 1. Thus, numeral 1 denotes a receiving means, while 2 denotes a responding means. Numerals 4-1, 4-2, ..., 4-n denote converting means which respectively convert a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into lengths of time, while numerals 5-1, 5-2, ..., 5-n denote counting means which count the waves of the received alternating electric) magnetic or electromagnetic field of a predetermined frequency within the respective time lengths obtained through conversion by the converting means 4-1 to 4-n and which perform binary coding of the respective counted values. Numeral 9 denotes control means which controls the responding means 2 in accordance with the plurality of binary codes determined by the counting means 5-1 to 5-n so as to effect a change in the alternating electric, magnetic or electromagnetic field to be sent back to the position detecting device.

Preferably, the responding means 2 is controlled in synchronization with the operation of the position detecting apparatus also when the plurality of kinds of information corresponding to the plurality of types of operation expressed by continuous amounts are sent back to the position detecting device.

Fig. 4 illustrates a further basic form of the position pointing device of the invention capable of coping with the above-mentioned demands. In this Figure, reference numerals which are the same as those appearing in Figs. 1 to 3 denote the same parts or components s those used in the basic forms of the invention described before. Thus, numeral 2 denotes responding means, 4-1 to 4-n denote converting means, 5-1 t 5-n denote counting means, 6 denotes receiving means, and 7 denotes timing extracting means. Numeral 10 designates control means which controls the responding means 2 in accordance with the plurality of binary codes determined by the counting means 5-1 to 5-n so a to change the alternating electric, magnetic or electromagnetic field to be sent back to the position detecting device.

In general, counting means consumes large electric power. Therefore, the number of the counting means for determining the binary codes indicative of the plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amount is preferably small.

Fig. 5 shows a still further basic form of the position pointing device in accordance with the present invention which cope with the above-described demand.

In this Figure, the reference numerals which are the same as those appearing in Figs. 1 to 4 denote the same parts r components as those in the basic forms described in connection with Figs. 1 to 4. Thus, the basic form of the position pointing device shown in Fig. 5 includes responding means 2, converting means 4-1 to 4-n, counting means 5, receiving means 6, timing extracting means 7 and control means 10. Numeral 11 designates counting control means which initiates the operations of the converting means 4 at a preselected timing based on a predetermined timing and initiates also the operation of the counting means 5 at the above-mentioned preselected timing or at another timing synchronous with the preselected timing. Numerals 12-1, 12-2, ..., 12-n denote information holding means which hold the values counted by the counting means 5 at the moments of termination of the respective time lengths determined by the respective converting means 4-1 to 4-n.

In order to shorten the time of operation of the counting means 5, it is preferred that the operation of the counting means 5 is ceased at the time when the

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value counted by the counting means 5 has reached a preset maximum value to be measured.

The converting means 4 also consumes large power. It is therefore preferred that the timings of operations of the plurality of converting means are suitably deviated when the plurality of kinds of information corresponding to a plurality of operations expressed by continuous amounts are converted into respective time lengths.

Fig. 6 shows a yet further basic form of the position pointing device of the present invention capable of coping with the above-described demand. In this Figure, the reference numerals which are the same as those appearing in Figs. 1 to 5 denote the same parts or members as those used in the basic forms described in connection with Figs. 1 to 5.

Thus, the basic form of the position pointing device shown in Fig. 6 has responding means 2, converting means 4-1 to 4-n, counting means 5, receiving means 6, timing extracting means 7, control mans 10 and information holding means 12-1 to 12-n. Numeral 13 denotes counting control means which initiates the operations of the plurality of converting means 4-1 to 4-n one after another at a series of timings, beginning with a preselected timing determined based on a predetermined timing and followed by successive timings determined at a predetermined time interval starting from the preselected timing. The counting control means 13 also serves to repeatedly initiate the operation of the counting means 5 at a series of timings beginning with the above-mentioned preselected timing and followed by successive timings with a predetermined time interval starting from the preselected timing or at other series of timings which is at a predetermined phase difference from the above-mentioned series of timings.

Fig. 7 shows a yet further basic form of the position pointing device in accordance with the present invention, capable for coping with the aforesaid demand. In this Figure, the reference numerals which are the same as those in Figs. 1 to 5 denote the same parts or components as those used in the basic forms described before in connection with Figs. 1 to 5. Thus, the basic form of the position pointing device of the invention shown in Fig. 7 has responding means 2, converting mean 4-1 to 4-n, counting means 5, receiving means 6, timing extracting means 7, control means 10 and information holding means 12-1 to 12-n. Numeral 14 denotes counting control means which initiates operation of one of the plurality of converting means 4-1 to 4-n at a preselected timing determined based on a predetermined timing and initiates the operation of the next converting means at the timing a which the time determined by the first-mentioned converting means is over, thus initiating the operations of the successive converting means one after another in the described manner. The counting control means 14 also repeatedly triggers the operation of the counting means 5 at the same timings as the start of operations of the successive converting means 4-1 to 4-n or at timings which are at a predetermined phase difference from these timings.

In order to shorten the time of operation of the counting means 5, the operation of the counting means 5 is ceased at the moment at which the time determined by the last one of the converting means 4-1 to 4-n expires or at a timing which is at a predetermined time difference from the expiration.

In order to ensure stable operations of the converting means 4-1 to 4-n and the counting means 5, where the alternating electric, magnetic or electromagnetic field is continuously radiated from the position detecting device for a predetermined period or a longer time followed by intermittent radiation conducted at a repetition period sufficiently shorter than the above-mentioned period of continuous radiation and with a predetermined duration, it is preferred that the timing of the field radiation conducted for the predetermined period or longer time is preferably used as the above-mentioned preselected timing.

The operations of the above-described basic forms of the invention are as follows.

In operation of the basic form of the position input device of the invention shown in Fig. 1, the counting means 5 counts only the waves which have been received within the time which is output from the converting means 4 and which is indicative of the information corresponding to the operation expressed by continuous amount, from among the waves of the waves of the alternating electric, magnetic or electromagnetic field of a predetermined frequency received by the receiving means 1. It is therefore possible to conduct, within minimal time, the binary coding of the time, i.e., the information corresponding to the operation expressed by the continuous amount. In addition, the binary coding can be performed without requiring generation of clock signal.

The converting means 4 may be realized with a time constant circuit including an element which exhibits a linear or continuous change of its characteristic such as resistance, inductance or capacitance. In such a case, the information corresponding to operation expressed by a continuous amount can be converted into time by using the change in the discharge characteristic of the time constant circuit. High efficiency of receipt of the alternating electric, magnetic or electromagnetic field by the receiving means 1, as well as high efficiency of transmission of the alternating electric, magnetic or electromagnetic field back from the responding means 2, is achievable when the receiving means 1 and the responding means 2 employ a resonance circuit. By varying the resonance characteristic of the resonance circuit by the control means 3, it is possible to change the alternating electric, magnetic or electromagnetic field to b sent back to the position detecting device. When the power extracting means is incorporated in the device, the circuits in the position detecting device can be driven by electric energy extracted from the alternating electric, magnetic or electromagnetic field received by the resonance circuit.

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In operation of the basic form of the invention shown in Fig. 2, the timing extracting means 7 extracts a predetermined timing from the alternating electric, magnetic or electromagnetic field received by the receiving means 6, and the control means 8 controls the responding means 2 at a preselected timing determined based on the predetermined timing. It is therefore possible to change, in synchronization with the operation of the position detecting device, the alternating electric, magnetic or electromagnetic field sent back to the position detecting device.

When the alternating electric, magnetic or electromagnetic field is intermittently radiated at a predetermined period with a predetermined duration, the responding means 2 may be controlled in synchronization with termination of the radiation of the alternating electric,magnetic or electromagnetic field, so as to make it possible to change the alternating electric, magnetic or electromagnetic field to be sent back in synchronization with the operation of the position detecting device and to provide a distinction or time sharing between the radiation of the alternating electric, magnetic or electromagnetic field from the position detecting device and the sending back of the alternating electric, magnetic or electromagnetic field from the position pointing device.

When the radiation of the alternating electric, magnetic or electromagnetic field at a predetermined frequency from the position detecting device is conducted continuously for a predetermined period or longer, followed by an intermittent radiation conducted at a period sufficiently shorter than the predetermined period and with a predetermined duration, and by controlling the responding means 2 in synchronization with the termination of the radiation during the intermittent radiation which is conducted after the continuous radiation performed for the predetermined period or longer time, it is possible to realize a time sharing between the detection of the coordinate values of the pointed position and the transmission of information corresponding to the operation expressed by the continuous amount

In operation of the basic form of the position pointing device of the invention shown in Fig. 3, the plurality of converting means 4-1 to 4-n respectively convert a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into lengths of time, while the plurality of counting means 5-1 to 5-n count the waves of the received alternating electric, magnetic or electromagnetic field of a predetermined frequency within the respective time lengths obtained through conversion by the converting means 4-1 to 4-n and then perform binary coding of the respective counted values. It is therefore possible to transmit to the position detecting device a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts.

In operation of the basic form of the position pointing device of the invention shown in Fig. 4, the timing extracting means 7 extracts a predetermined timing from the alternating electric, magnetic or electromagnetic field received by the receiving means 6, and the control means 10 controls the responding means 2 at a preselected timing determined based on the predetermined timing. It is therefore possible to change the alternating electric, magnetic or electromagnetic field sent back to the position detecting device, in synchronization with the operation of the position detecting device.

In operation of the basic form illustrated in Fig. 5, the counting control means 11 initiates the operations of the converting means 4-1 to 4-n at a preselected timing based on a predetermined timing and initiates also the operation of the counting means 5 at the above-mentioned preselected timing or at another timing which is at a predetermined phase difference from the preselected timing. In addition, the information holding means 12-1 to 12-n hold the values counted by the counting means 5 at the moments of expiration of the respective time lengths determined by the respective converting means 4-1 to 4-n. It is therefore possible to determine, with a single counting means, a plurality of binary codes representative of a plurality of kinds of information corresponding to a plurality of type of operation expressed by continuous amounts.

By arranging such that the operation of the counting means 5 is ceased at the time when the value counted by the counting means 5 has reached a preset maximum value to be measured, it is possible to shorten the operation time of tile counting means 5, while enabling setting of the maximum value of the binary code.

In operation of the basic form shown in Fig. 6, the counting control means 13 initiates the operations of the plurality of converting means 4-1 to 4-n one after another at a series of timings, beginning with a preselected timing determined based on a predetermined timing and followed by successive timings determined at a predetermined time interval starting from the preselected timing. The counting control means 13 also serves to repeatedly initiate the operation of the counting means 5 at a series of timings beginning with the above-mentioned preselected timing and followed by successive timings with a predetermined time interval starting from the preselected timing or at other series of timings which is at a predetermined phase difference from the above-mentioned series of timings.

It is therefore possible to operate the plurality of converting means 4-1 to 4-n at different timings when they convert the plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into respective time lengths.

In operation of the basic form shown in Fig. 7, the counting control means 14 initiates operation of one of the plurality of converting means 4-1 to 4-n at a preselected timing determined based on a predetermined timing and initiates the operation of the next converting means at the timing a which the time determined by the first-mentioned converting means is over, thus initiating the operations of the successive converting means one after another in the described manner. The counting

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control means 14 also repeatedly triggers the operation of the counting means 5 at the same timings as the start of operations of the successive converting means 4-1 to 4-n or at timings which are at a predetermined phase difference from these timings. It is therefore possible to operate the plurality of converting means 4-1 to 4-n at different timings when they convert the plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into respective time lengths, while shortening the time of operation of the counting means 5.

By arranging such that the operation of the counting means 5 is ceased at the moment at which the time determined by the last one of the converting means 4-1 to 4-n expires or at a timing which is at a predetermined time difference from the expiration, it is possible to minimize the time of operation of the counting means 5.

In the case where the alternating electric, magnetic or electromagnetic field is continuously radiated from the position detecting device for a predetermined period or a longer time followed by intermittent radiation conducted at a period sufficiently shorter than the above-mentioned period and with a predetermined duration, it is possible to stably operate the converting means 4-1 to 4-n and the counting means 5 by arranging such that the timing of the field radiation conducted for the predetermined period or longer time is used as the above-mentioned preselected timing.

Fig. 8 shows an embodiment of the position pointing device in accordance with the basic form of the invention shown in Fig. 2. This embodiment is used in combination with a position detecting device of the type in which electric wave of a predetermined frequency is radiated continuously for a predetermined time or longer, followed by an intermittent radiation conducted at a period which is sufficiently shorter than the period of the continuous radiation with a predetermined duration. This position pointing device has a resonance circuit 21, a power supply circuit 22, a timing extracting circuit 23, a continuous signal detecting circuit 24, a pen-pressure/time converting means 25, a counter 26, a delay circuit 27 and a parallel/serial (P/S) converting circuit 28.

The resonance circuit 21 is of a known type composed of a coil and a capacitor. The resonance characteristics, i.e.,frequency and amplitude of resonance, are variable by an external control. The power supply circuit 22 also is of a known type composed of a diode and a capacitor. The power supply circuit forms a D.C. power voltage from a voltage which is inducted in the resonance circuit 21 by the electric wave radiated from the position detecting device, and supplies the power voltage to other circuits in the position pointing device. The timing extracting circuit 23 extracts a predetermined timing from the voltage which is induced in the resonance circuit 21 by the electric wave radiated from the position detecting device. In this embodiment, the timing of the above-mentioned intermittent radiation of the electric wave which is conducted following the continuous radiation is detected as the above-mentioned predetermined timing.

Fig. 9 shows an example of the continuous signal detecting circuit 24. This circuit includes a detecting circuit having a diode 241, an integrating circuit having a resistor 242 and a capacitor, and a shaping circuit having a resistor 244 and a buffer amplifier 245. Fig. 10 shows waveforms of signals appearing in the circuit shown in Fig. 9 in response to a continuous alternating signal I which has a duration not shorter than a predetermined period. It will be seen that the alternating signal I is rectified by the diode 241 and then integrated by the resistor 242 and the capacitor 243 so as to become a signal II which is then shaped by the resistor 24 and the buffer amplifier 245 so as to become a continuous pulse signal III.

Fig. 18 illustrates an example of the pen-pressure/time converting means 25. The pen-pressure time converting means 25 has a differentiating circuit composed of a capacitor 252 and a variable-resistance element 251 which varies its resistance in accordance with an operation which is expressed by a continuous amount. In this case, the operation is a change in the pen pressure. More specifically, the resistance value of the element 251 increases as the pen pressure increases. Fig. 12 shows, by way of example, waveforms of signals appearing in the circuit shown in Fig. 11 in response to a continuous pulse signal IV input thereto from the continuous signal detecting circuit 24. The attenuation characteristic, i.e., attenuation time, of the output signal V varies in accordance with the change in the resistance value of the variable-resistance element 251. More specifically, the time required for attenuation becomes longer as the resistance value increases. The diode 253 is used for the purpose of preventing generation of a negative voltage at the time of fall of the pulse signal.

The variable-resistance element may be substituted by a capacitor which changes its capacitance in accordance with a change in the pen pressure or an inductance element which changes its inductance in accordance with a change in the pen pressure.

The counter 26 counts the number of waves of the voltage inducted in the resonance circuit 21 by the electric wave radiated from the position detecting device, within the period of the signal output from the pen-pressure/time converting means 25. The delay circuit 27 serves to delay the timing signal extracted by the timing extracting circuit 23, by a predetermined length of time. The P/S converting circuit 28 serves to supply the contents of the counter 26 to the resonance circuit 21 in synchronization with the timings of electric waves which are intermittently radiated from the position detecting device at a constant period, thereby changing the resonance characteristic of the resonance circuit 21.

The aforementioned receiving means 6 and the responding means 2 are constituted by the resonance circuit 21. The timing extracting circuit 23 serves as the timing extracting means 7 mentioned before. The con-

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verting means 4 is constituted by the continuous signal detecting circuit 24 and the pen-pressure/time converting means 25. The counter 26 functions as the counting means 5. The continuous signal detecting circuit 24, delay circuit 27 and the P/S converting circuit 28 in cooperation provide the control means 8 mentioned before.

The operation of the embodiment shown in Fig. 8 will be described with reference to Fig. 13 which shows waveforms of signals appearing at various portions of this embodiment. It is assumed here that the embodiment is used in combination with a position detecting device of the type which is disclosed in Japanese Patent Laid-Open No. 3-189716.

Referring to Fig. 13, the position detecting device radiates an electric wave signal of a predetermined frequency at timings shown by a waveform (a). In response to this electric wave signal, the resonance circuit 21 produces a signal (b) corresponding to the waveform (a). The voltage level of the signal (b) does not rise steeply in response to the receipt of the electric wave sinal (a) not it drops sharply in response to the fall of the same, due to transient phenomenon peculiar to the resonance circuit 21.

The signal (b) is delivered to the power supply circuit 22 which extracts D.C. power from this signal. The extracted D.C. power is used in driving various circuits in the position pointing device. The signal (b) also is delivered to the counter 26 so as to be used as a clock signal. At the same time, the signal (b) is supplied to the timing extracting circuit 23 so as to become a signal (c) indicative of the timings of radiation of the electric wave from the position detecting device. The signal (c) indicative of the radiation timings is delivered to the delay circuit 27 so as to form a signal (d) which is delayed a predetermined time after the signal (c). The signal (c) also is delivered to the continuous signal detecting circuit 24 which forms, based on the signal (c), a signal (e) which lasts from a moment at which the signal (c) has been held for a time not shorter than a predetermined time till a moment which is lagged predetermined time behind the extinction of the series of intermittent pulse signal which follows the continuation of the signal (c). The signal (d) which is generated by delaying the signal (c) is intended to be used in a later-mentioned control of operation timing of the resonance circuit 21 such that the resonance circuit 21 is controlled in phase with the timing of suspension of radiation of the electric wave from the position detecting device, i.e., with the timing of receipt of the electric wave by the position detecting device.

The signal (e) is delivered to the pen-pressure/time converting means 25 so as to form a signal (f) of a duration which corresponds to the pen pressure. The signal (f) is input to the counter 26. The counter 26 counts the signal (b) throughout a certain period in which the level of the signal (f) is higher than a predetermined level, and produces a count value (g) which is expressed by a digital signal having a plurality of bits. The signal (g) shown in Fig. 13 is the signal which is in the least significant bit in the counter 26. The signal (g) is delivered to the P/S converting circuit 28 in a bit-parallel manner.

During the high-level period of the signal (e), the P/S converting circuit 28 delivers the digital signals of 8 bits received from the counter 26 to the resonance circuit 21 in synchronization with the rise of the eight pulses in the intermittent pulse signal (d). When the digital signal supplied to the resonance circuit 21 is "0", no change is caused in the resonance circuit 21, whereas, when the digital signal received by the resonance circuit 21 is "1", the resonance characteristic of the resonance circuit 21 is changed. For instance, the resonance circuit 21 is short-circuited so as to be set to a state in which it does not produce any signal.

The illustrated waveforms of the signals (b), (c) and (d) are obtained on conditions that the pen pressure is zero and that the content (g) of the counter 26 is zero, i.e., that the 8-bit digital signals are "00000000".

It is assumed here that a predetermined level of pen pressure is applied, so that an 8-bit digital signal "10010011" is delivered as the content (g) of the counter 26 to the P/S converting circuit 28. In this case, the P/S converting circuit 28 delivers to the resonance circuit a bit-serial signal (h) consisting of "1", "0", "0", "1", "0", "0", "1" and "1", in synchronization with the rise of the successive pulses in the aforementioned signal (d).

As stated before, the resonance circuit 21 in receipt of a digital signal "1" is short-circuited so as not to produce any signal. In this case, a signal (b') is obtained in place of the signal (b). Consequently, signals (c') and (d') are obtained in place of the aforesaid signals (c) and (d).

As will be clearly seen from the timings of the signal (a) and the signal (b'), at the timing at which the position detecting device is bound to receive the electric wave, there is a signal in the resonance circuit 21 when the latter is in receipt of the digital signal "0", whereas, when the same is in receipt of the digital signal "1", there is no signal in the resonance circuit 21, so that the position detecting device cannot receive any electric wave. Therefore, the position detecting device can acquire the content of the counter 26, i.e., information corresponding to the predetermined level of the pen pressure, based on whether or not any electric wave is received at the due timing.

It is conceivable that, depending on the values set on the elements of the pen-pressure/time converting means 25, the signal (f) may have a duration longer than a predetermined time length even when the pen pressure is zero,with the result that the content of the counter 26 fails to become "0". In such a case, the arrangement may be such that the P/S converting circuit 28 receives only the digital signals of bits which are on the more significant side of the bit at which "1" appears for the first time.

Fig. 14 illustrates a practical example of the embodiment of the position pointing device of the invention shown in Fig. 8. In this Figure, numerals 31, 32 denote

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buffer amplifiers, 33, 34, 35 denote inverters, 36 denotes AND gate, 37 denotes an analog switch, 38 denotes a counter and 39 denotes a parallel/serial converting circuit. These circuits are realized in a C-MOS circuit having a high input impedance.

In the embodiment described hereinbefore, the electric waves are radiated eight times during the period of intermittent radiation from the position detecting device subsequent to the period of continuous radiation. This number of radiation cycles during the period of the intermittent radiation, however, is not exclusive, and may be suitably determined so as to be equal to the number of the bits which is sufficient to express the continuous amount such as the pen pressure. It is also possible to add the radiation cycles of a number corresponding to the number of bits necessary for expressing another kind of information, so that the information can be transmitted to the position detecting device in addition to the pen-pressure information.

Fig. 15 shows another embodiment of the position pointing device of the present invention, adapted to be used in combination with the basic form of the invention explained before in connection with Fig. 5, wherein the radiation of electric wave of a predetermined frequency from the position detecting device includes continuous radiation which lasts far a predetermined time or longer and a subsequent intermittent radiation which is conducted with a repetition period sufficiently shorter than the time length of the continuous radiation and which lasts over a predetermined duration. This position pointing device includes a resonance circuit 41, a power supply circuit 42, a timing extracting circuit 43, a continuous signal detecting circuit 44, continuous-amount/time converting circuits 45-1, 45-2, 45-3 and 45-4, a counter 46, a comparator circuit 47, latches 48-1, 48-2, 48-3 and 48-4, a delay circuit 49, and a parallel/serial (P/S) converting circuit 50.

Fig. 16 illustrates an example of the resonance circuit 41. The resonance circuit 41 is constituted by an analog switch 413 and a resonator circuit composed of a coil 411 and a capacitor 412. The analog switch is controlled so as to be turned on and off in accordance with the signal from the P/S converting circuit 50. More specifically, the analog switch 413 is turned off and on, respectively, when the level of the signal from the P/S converting circuit 50 is low and high. When the analog switch 413 is turned on, the electrostatic charges stored in the capacitor 412 are discharged so as to set the signal voltage to zero. In this example, the signal voltage in the resonator circuit is controlled in accordance with the level of the signa from the P/S converting circuit 50. This, however, is only illustrative and the arrangement may be such that the resonance frequency is controlled. A diode 414 is used for the purpose or preventing any negative voltage from being applied to the analog switch 413.

The power supply circuit 42 is of a known type constituted by a diode and a capacitor, and is adapted to form a D.C. voltage from the voltage induced in the resonance circuit 41 by the electric wave radiated from the position detecting device. The D.C. power thus obtained is used as the power for driving various circuits in the device.

Fig. 17 shows an example of the timing extracting circuit 43. This timing extracting circuit includes a detecting circuit composed of a diode 431, capacitor 432 and a resistor 433, and a buffer amplifier 434. Fig. 18 is a waveform chart showing waveforms of signals appearing at various portions of the circuit shown in Fig. 17.

An alternating current signal VII is generated in the resonance circuit 41 in response to an electric wave signal VI intermittently radiated from the position detecting device. The alternating current signal VII is envelope-detected by the detecting circuit composed of the diode 431, capacitor 432 and the resistor 433, and is then shaped by the buffer amplifier 434 so as to become a pulse signal VIII.

Fig. 19 illustrates an example of the continuous signal detecting circuit 44. The continuous signal detecting circuit includes an integrating circuit composed of a diode 441, a resistor 442 and a capacitor 443, and a buffer amplifier 445. Fig. 20 is a waveform chart showing waveforms of signals obtained at various portions of the circuit shown in Fig. 19. Electric wave IX is radiated from the position detecting device. The radiation includes continuous radiation which is conducted for a predetermined length of time or longer and a subsequent intermittent radiation which is conducted with a repetition period sufficiently shorter than the time length or the continuous radiation and which has a predetermined duration. In response to the electric wave signal IX, the resonance circuit 41 generates an alternating current signal X which is then delivered to the timing extracting circuit 43, whereby an extracted pulse signal XI is formed. The pulse signal XI is then integrated by the integrating circuit composed of the diode 441, resistor 442 and the capacitor 443 so as to form a signal XII which is then shaped by the buffer amplifier 444 so as to become a signal XIII which contains only a continuous pulse.

Fig. 21 illustrates, byway of example, the construction of one of the continuous-amount/time converting circuits 45-1 to 45-4. This circuit is constituted by a differentiation circuit composed of a capacitor 452 and a variable-resistance element whose resistance varies in accordance with an operation expressed by a continuous amount, and a buffer amplifier 453. Fig. 22 shows, by way of example, waveforms of signals at different portions of the circuit shown in Fig. 21. In this case, a continuous pulse signal XIV derived from the Continuous signal detecting circuit 44 is input to the circuit shown in Fig. 21. The pulse signal XIV is differentiated by the variable-resistance element 451 and the capacitor 452 so as to become a signal XV which is then shaped by the buffer amplifier 453 so a to form an output signal XVI. The attenuation,characteristic, i.e., attenuation time, of the signal XV varies according to

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the resistance value of the variable-resistance element 451. More specifically, the time required for attenuation becomes longer as the resistance value increases. Consequently, the duration or pulse width of the output signal XVI also varies in accordance with the resistance value of the variable-resistance element 451, i.e., in accordance with the operation expressed by the continuous amount. A diode 454 is used for the purpose of preventing generation of negative voltage when the pulse signal falls.

The counter 46 counts the number of waves or peaks of the voltage induced in the resonance circuit 41 by the electric ave radiated from the position detecting device, throughout a period between a moment at which the continuous signal detected by the continuous signal detecting circuit 44 is input and a moment at which a stop signal is input from the comparator circuit 47. The comparator circuit 47 compares the content of the counter 46 with the maximum value to be measured and produces the above-mentioned stop signal when the maximum value is reached.

Latches 48-1 to 48-n hold the contents of the counter 46 as obtained at moments of fall of the output signals from the respective continuous-amount/time converting circuits 45-1 to 45-n. The delay circuit 49 effects a delay of the timing signal extracted from the timing extracting circuit 43 by a predetermined length of time. The P/S converting circuit 50 serves to serially deliver the counted values held by the latches 48-1 to 48-n to the resonance circuit 41 in synchronization with the timings of intermittent radiation of electric wave from the position detecting device, out of the timings extracted by the timing extracting circuit 43, thereby causing a change in the resonance characteristic of the resonance circuit 41.

The aforementioned receiving means 6 and the responding means 2 are constituted by the resonance circuit 41. The timing extracting circuit 23 serves as the timing extracting means 7 mentioned before. The converting means 4-1 to 4-n are constituted by the continuous signal detecting circuit 44 and the continuous-amount/time converting circuits 45-1 to 45-4. The counter 46 functions as the counting means 5. The continuous signal detecting circuit 44, delay circuit 49 and the P/S converting circuit 50 in cooperation provide the control means 10 mentioned before. The continuous signal detecting circuit 44 and the comparator circuit 47 in combination provide the counting control means 11. The aforementioned information holding means 12-1 to 12-4 are constituted by the latches 48-1 to 48-4.

The operation or the embodiment shown in Fig. 15 will be described with reference to Fig. 23 which shows waveforms of signals appearing at various portions of this embodiment. It is assumed here that the embodiment is used in combination with a position detecting device of the type which is disclosed in Japanese Patent Laid-Open No. 3-189716.

Referring to Fig. 23, the position detecting device radiates an electric wave signal of a predetermined frequency at timings shown by a waveform (i). In response to this electric wave signal, the resonance circuit 41 produces a signal (j) corresponding to the waveform (i). The voltage level of the signal (j) does not rise steeply in response to the receipt of the electric wave sinal (a) not it drops sharply in response to the fall of the same, due to transient phenomenon peculiar to the resonance circuit 41.

The signal (j) is delivered to the power supply circuit 42 which extracts D.C. power from this signal. The extracted D.C. power is used in driving various circuits in the position pointing device. The signal (j) also is delivered to the counter 46 so as to be used as a clock signal. At the same time, the signal (j) is supplied to the timing extracting circuit 43 so as to become a signal (k) indicative of the timings of radiation of the electric wave from the position detecting device. The signal (k) indicative of the radiation timings is delivered to the delay circuit 49 so as to form a signal (m) which is delayed a predetermined time after the signal (k). The signal (k) also is delivered to the continuous signal detecting circuit 44 which forms a signal (p) which takes high level only when the signal (k) is maintained continuously over a predetermined period. The signal (m) which is generated by delaying the signal (k) is intended to be used in a later-mentioned control of operation timing of the resonance circuit 41 such that the resonance circuit 41 is controlled in phase with the timing of suspension of radiation of the electric wave from the position detecting device, i.e., with the timing of receipt of the electric wave by the position detecting device.

The signal (p) is supplied to the counter 46 to initiate the counting by the counter 46. The signal (p) also is supplied to the continuous-amount/time converting means 45-1 to 45-4. The counter 46 counts the signals (j) and produces a count value (q) which is expressed by a digital signal having a plurality of bits. The signal (q) shown in Fig. 23 is the signal which is in the least significant bit in the counter 46. The signal (q) is delivered to the comparator circuit 47 and also to the latches 48-1 to 48-n in a bit-parallel manner.

Based on the signal (p), the continuous-amount/time converting means 45-1 to 45-4 respectively produce signals of durations or pulse widths corresponding to the continuous amounts 1 to 4, and delivers these signals to the latches 48-1 to 48-4, respectively. For instance, the continuous-amount/time converting circuit 45-1 produces a signal (r) and delivers it to the associated latch 48-1. The latches 48-1 to 48-4 temporarily hold the contents of the counter 46 as obtained at moments of fall of the signals from the continuous-amount/time converting means 45-1 to 45-4. The operation of the counter 46 is ceased when its content has reached the aforementioned maximum value, in response to a stop signal from the comparator circuit 47.

The P/S converting circuit 50 delivers the four digital signals each having a plurality of bits (8 bits in this case), held by the latches 48-1 to 48-4 to the resonance

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circuit 41 in synchronization with the rise of the pulses of the intermittent pulse signal (m). When the digital signal supplied to the resonance circuit 21 is "0", no change is caused in the resonance circuit 41, whereas, when the digital signal received by the resonance circuit 21 is "1", the resonance circuit 41 is switched by being short-circuited to a state in which it does not produce any signal.

The illustrated waveforms of the signals (j), (k) and (m) are obtained on conditions that the four continuous amounts 1 to 4 are all zero so the four counted values held by the latches 48-1 to 48-4 are all zero, i.e,, that all the bits of the four 8-bit digital signals are zero.

It is assumed here that a predetermined continuous amounts 1 to 3 are applied so that 8-bit digital signals "10011000", "11000011" and "11010101" are held as the count values by the latches 48-1 to 48-3. Consequently, the P/S converting circuit 50 delivers to the resonance circuit 41 a serial signal "1", "0", "0", "1", "1", "0", "0", "0", "1", "1", "0", "0", "0", "0", "1", "1", "1", "1", "0", "1", "0", "1", "0", "1", in synchronization with the timings of rise of the pulses in the aforementioned signal (m).

As stated before, the resonance circuit 21 in receipt of a digital signal "1" is short-circuited so as not to produce any signal. In this case, a signal (j') is obtained in place of the signal (j). Consequently, signals (k') and (m') are obtained in place of the aforesaid signals (k) and (m).

As will be clearly seen from the timings of the signal (i) and the signal (j'), at the timing at which the position detecting device is bound to receive the electric wave, there is a signal in the resonance circuit 41 when the latter is in receipt of the digital signal "0", whereas, when the same is in receipt of the digital signal "1", there is no signal in the resonance circuit 41, so that the position detecting device cannot receive any electric wave. Therefore, the position detecting device can acquire the four counted values held by the latches 48-1 to 48-4, i.e., four kinds of information corresponding to continuous amounts 1 to 4, based on whether or not any electric wave is received at the due timing.

It is conceivable that, depending on the values set on the elements of the of each of the continuous-amount/time converting means 45-1 to 45-n, the output signal from such means may have a duration longer than a predetermined time length even when the associated continuous amount is zero, with the result that the count value held by each latch fails to become "0". To overcome this problem, the arrangement may be such that the P/S converting circuit 50 receives only the digital signals of bits which are on the more significant side of the bit at which "1" appears for the first time.

In the embodiment described in connection with Fig. 15, the electric waves are radiated 32 times, i.e., 8 times for each of the four counted values, during the period of intermittent radiation from the position detecting device subsequent to the period of continuous radiation. This number of radiation cycles during the period of the intermittent radiation, however, is not exclusive, and may be suitably determined so as to be equal to the number of the bits which is sufficient to express the number of the continuous amounts and the values of these continuous amounts. It is also possible to increase the number of radiation cycles in the intermittent radiation by a number corresponding to the number of bits necessary for expressing any other kind of information, so that such information can be transmitted to the position detecting device in addition to the above-mentioned four kinds of information.

The position detecting device may be of the type which is capable of detecting the state of coupling between itself and the position pointing device. The detection of the state of coupling can be done immediately before the termination of the intermittent radiation of the electric wave from the position detecting device.

As will be understood from the foregoing description, the present invention offers various advantages as follows.

In one aspect, the invention provides a position pointing device, comprising: receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated from a position detecting device; responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to the position detecting device; control means for controlling the responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, no as to cause a change in the alternating electric, magnetic or electromagnetic field to be sent back to the position detecting device; converting means for converting the information corresponding to the operation into a time length; and counting means for counting the number of waves of the alternating electric, magnetic or electromagnetic field of the predetermined frequency received within the time length determined by the converting means and for binary-coding the counted value.

According to this arrangement, the information corresponding to the operation expressed by a continuous amount can be coded without requiring A/D converter and clock oscillator which consume large electric power, thus realizing a position pointing device operable with reduced electric power. Consequently, requirement for replacement or recharging of any internal battery is reduced or the position pointing device can be realized without using any battery at all.

In another form of the present invention, there is provided a position pointing device, comprising: receiving means for receiving alternating electric, magnetic Or electromagnetic field of a predetermined frequency radiated at predetermined timings from a position detecting device; responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to the position detecting device; timing extracting means for extracting the predetermined timings from the received alternating electric, magnetic or electromagnetic field; control means for

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controlling, at preselected timings based on the predetermined timings, the responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in the alternating electric, magnetic or electromagnetic field to be sent back to the position detecting device; converting means for converting the information corresponding to the operation into a time length; and counting means for counting the number of waves of the alternating electric, magnetic or electromagnetic field of the predetermined frequency received within the time length determined by the converting means and for binary-coding the counted value.

According to this arrangement, it is possible to obtain a high efficiency of transmission to the position detecting device of the information corresponding to the operation expressed by the continuous amount.

In still another form, the present invention provides a position pointing device, comprising: receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated from a position detecting device; responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to the position detecting device; control means for controlling the responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in the alternating electric, magnetic or electromagnetic field to be sent back to the position detecting device; a plurality of converting means for converting a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into time lengths; and a plurality of counting means for counting the numbers of waves of the alternating electric, magnetic or electromagnetic field of the predetermined frequency received within the respective time lengths determined by the converting means and for binary-coding the counted values.

According to this arrangement, it is possible to transmit to the position detecting device a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts.

In a different form of the invention, a position pointing device is provided which comprises: a position pointing device, comprising: receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated at predetermined timings from a position detecting device; responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to the position detecting device; timing extracting means for extracting the predetermined timings from the received alternating electric, magnetic or electromagnetic field; control means for controlling, at preselected timings based on the predetermined timings, the responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in the alternating electric, magnetic or electromagnetic field to be sent back to the position detecting device, a plurality of converting means for converting a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into time lengths; and a plurality of counting means for counting the numbers of waves of the alternating electric, magnetic or electromagnetic field of the predetermined frequency received within the respective time lengths determined by the converting means and for binary-coding the counted values.

With this arrangement, it is possible to efficiently transmit to the position detecting device a plurality of kinds of information corresponding to a plurality of type of operation expressed by continuous amounts.

In a different form of the invention, a position pointing device is provided which comprises: receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated at predetermined timings from a position detecting device; responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to the position detecting device; timing extracting means for extracting the predetermined timings from the received alternating electric, magnetic or electromagnetic field; control means for controlling, at preselected timings based on the predetermined timings, the responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in the alternating electric, magnetic or electromagnetic field to be sent back to the position detecting device; a plurality of converting means for converting a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into time lengths; counting means for counting the numbers of waves of the received alternating electric, magnetic or electromagnetic field of the predetermined frequency and for binary coding the counted value; counting control means for initiating the operation of the plurality of converting means at a preselected timing based on the predetermined timings while initiating the operation of the counting means at the preselected timing or a timing synchronized therewith; and information holding means for holding the counted values as obtained in the counting means at moments at which the time lengths determined by the converting means expire.

According to this arrangement, it is possible to determine binary codes representative of a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts, by using only one counting means, thus contributing to reduction in the electrical power consumption.

In a different form of the invention, there is provided a position pointing device, comprising: receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated at predetermined timings from a position detecting device;

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responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to the position detecting device; timing extracting means for extracting the predetermined timings from the received alternating electric, magnetic or electromagnetic field; control means for controlling, at preselected timings based on the predetermined timings, the responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in the alternating electric, magnetic or electromagnetic field to be sent back to the position detecting device; a plurality or converting means for converting a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into time lengths; counting means for counting the numbers of waves of the received alternating electric, magnetic or electromagnetic field of the predetermined frequency and for binary coding the counted value; counting control means for successively initiating the operations of the plurality of converting means one after another at a series of timings of a predetermined time interval starting with a preselected timing based on the predetermined timings, while repeatedly initiating the operation of the counting means at the series of timings or at timings synchronized therewith; and information holding means for holding the counted values as obtained in the counting means at moments at which the time lengths determined by the converting means expire.

This arrangement enables the plurality of converting means to operate at different timings in converting the plurality of kinds of information corresponding to the plurality of types of operation expressed by continuous amounts into respective time lengths, thus reducing the instantaneous power consumption.

When the arrangement is such that the operation of the counting means is ceased when the value counted by the counting means has reached a predetermined maximum value to be measured, it is possible to shorten the time length of operation of the counting means, thus reducing the electrical power consumption.

In a different form of the invention, a position pointing device comprises: receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated at predetermined timings from a position detecting device; responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to the position detecting device; timing extracting means for extracting the predetermined timings from the received alternating electric, magnetic or electromagnetic field; control means for controlling, at preselected timings based on the predetermined timings, the responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in the alternating electric, magnetic or electromagnetic field to be sent back to the position detecting device; a plurality of converting means for converting a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into time lengths; counting means for counting the numbers of waves of the received alternating electric, magnetic or electromagnetic field of the predetermined frequency and for binary coding the counted value; counting control means for initiating the operation of one of the plurality of converting means and then initiating the operation of the next one of the plurality of converting means at a timing at which the time length determined by the one of the plurality of converting means expires or at a timing synchronized therewith, thus sequentially initiating operations of the remainder converting means one after another, while repeatedly initiating the operation of the counting means at the timings of initiation of the successive converting means or at timings synchronized therewith; and information holding means for holding the counted values as obtained in the counting means at moments at which the time lengths determined by the converting means expire.

This arrangement enables the plurality of converting means to operate at different timings in converting the plurality of kinds of information corresponding to the plurality of types of operation expressed by continuous amounts into respective time lengths, thus reducing the instantaneous power consumption. In addition, it is possible to shorten the time length of operation of the counting means. It is therefore possible to reduce both instantaneous power consumption and total power consumption.

If the arrangement is such that the operation of the counting means is ceased at a timing at which the time length determined by the converting means which is operated last expires or at a timing synchronized therewith, it is possible to minimize the operation time of the counting means, further contributing to reduction in the electrical power consumption.

In one specific form of the position pointing device of the invention, the alternating electric, magnetic or electromagnetic field of the predetermined frequency is intermittently radiated from the position detecting device over a predetermined duration at a predetermined period of repetition, and the responding means is controlled in synchronization with the suspension of radiation during the intermittent radiation of the alternating electric, magnetic or electromagnetic field.

According to this arrangement, it is possible to obtain a clear time sharing or distinction between the radiation of the alternating electric, magnetic or electromagnetic field from the position detecting device and the sending of the alternating electric, magnetic or electromagnetic field back to the position detecting device, thus realizing high degrees of reliability and efficiency of transmission of information corresponding to operation expressed by a continuous amount to the position detecting device.

In another specific form of the present invention, the radiation of the alternating electric, magnetic or electro-

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magnetic field of the predetermined frequency from the position pointing device includes a continuous radiation conducted for a predetermined length of time or longer and a subsequent intermittent radiation conducted over a predetermined duration with a repetition period sufficiently shorter than the time length of the continuous radiation, and the responding means is controlled in synchronization with the suspension of radiation which occurs after the continuous radiation conducted for the predetermined length of time or longer.

According to this arrangement, it is possible to obtain a clear distinction between the timing of detection of the coordinate values of the pointed position on the position detecting device and the timing of transmission of the information corresponding to the operation expressed by a continuous amount, thus realizing high degrees of reliability and efficiency of transmission of information corresponding to operation expressed by a continuous amount to the position detecting device.

In another specific form of the invention, the radiation of the alternating electric, magnetic or electromagnetic field of the predetermined frequency from the position pointing device includes a continuous radiation conducted for a predetermined length of time or longer and a subsequent intermittent radiation conducted over a predetermined duration with a repetition period sufficiently shorter than the time length of the continuous radiation, and the timing of radiation of the alternating electric, magnetic or electromagnetic field from the position detecting device conducted for the predetermined length of time or longer is used as the aforementioned preselected timing.

According to this arrangement, it is possible to stably operate a plurality of converting means and counting means.

In a specific form of the invention in which the converting means comprises an element which continuously changes its characteristic in accordance with the operation expressed by a continuous amount, the converting means can be realized with a simple construction.

In a still another specific form of the invention, the converting means comprises a time constant circuit including an element which continuously changes its resistance, inductance or capacitance in accordance with the operation expressed by a continuous amount.

This arrangement provides converting means which is simple in construction and which can operate with reduced power consumption.

In still another specific form of the invention, both the receiving means and the responding means make use of a resonance circuit.

According to this arrangement, it is possible to realize high efficiency of receipt of the alternating electric, magnetic or electromagnetic field from the position detecting device, as well as high efficiency of sending of the alternating electric, magnetic or electromagnetic field back to the position detecting device.

When the resonance circuit is used, the control means may be arranged to control the resonance characteristic of the resonance circuit.

With this arrangement, it is possible to easily vary the alternating electric, magnetic or electromagnetic field which is set back to the position detecting device.

In still another specific form of the invention, the position pointing device incorporates power extracting means for extracting electric energy for driving circuits in the device, from the alternating electric, magnetic or electromagnetic field of the predetermined frequency received by the resonance circuit.

Such power extracting means eliminates the necessity for specific power supply means such as batteries.

Claims

1. A position pointing device having receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated from a position detecting device and responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to said position detecting device, characterized in that said position pointing device comprising:

   control means for controlling said responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in said alternating electric, magnetic or electromagnetic field to be sent back to said position detecting device;
   converting means for converting said information corresponding to said operation into a time length; and
   counting means for counting the number of waves of said alternating electric, magnetic or electromagnetic field of the predetermined frequency received within the time length determined by said converting means and for binary-coding the counted value.

2. A position pointing device having receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated at predetermined timings from a position detecting device and responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to said position detecting device, characterized in that said position pointing device comprising:

   timing extracting means for extracting said predetermined timings from the received alternating electric, magnetic or electromagnetic field;
   control means for controlling, at preselected timings based on said predetermined timings,

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said responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in said alternating electric, magnetic or electromagnetic field which is to be sent back to said position detecting device;

converting means for converting said information corresponding to said operation into a time length; and

counting means for counting the number of waves of said alternating electric, magnetic or electromagnetic field of the predetermined frequency received within the time length determined by said converting means and for binary-coding the counted value.

3. A position pointing device having receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated from a position detecting device and responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to said position detecting device, characterized in that said position pointing device comprising:

control means for controlling said responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in said alternating electric, magnetic or electromagnetic field to be sent back to said position detecting device;

a plurality of converting means for converting a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into time lengths; and

a plurality of counting means for counting the numbers of waves of said alternating electric, magnetic or electromagnetic field of the predetermined frequency received within the respective time lengths determined by said converting means and for binary-coding the counted values.

4. A position pointing device having receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated at predetermined timings from a position detecting device and responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to said position detecting device, characterized in that said position pointing device comprising:

timing extracting means for extracting said predetermined timings from the received alternating electric, magnetic or electromagnetic field;

control means for controlling, at preselected timings based on said predetermined timings, said responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in said alternating electric, magnetic or electromagnetic field to be sent back to said position detecting device;

a plurality of converting means for converting a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into time lengths; and

a plurality of counting means for counting the numbers of waves of said alternating electric, magnetic or electromagnetic field of the predetermined frequency received within the respective time lengths determined by said converting means and for binary-coding the counted values.

5. A position pointing device having receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated at predetermined timings from a position detecting device and responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to said position detecting device, characterized in that said position pointing device comprising:

timing extracting means for extracting said predetermined timings from the received alternating electric, magnetic or electromagnetic field;

control means for controlling, at preselected timings based on said predetermined timings, said responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in said alternating electric, magnetic or electromagnetic field to be sent back to said position detecting device;

a plurality of converting means for converting a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into time lengths;

counting means for counting the numbers of waves of the received alternating electric, magnetic or electromagnetic field of the predetermined frequency and for binary coding the counted value;

counting control means for initiating the operation of said plurality of converting means at a preselected timing based on said predetermined timings while initiating the operation of said counting means at said preselected timing or a timing synchronized therewith; and

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information holding means for holding the counted values as obtained in said counting means at moments at which the time lengths determined by said converting means expire.

6. A position pointing device having receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated at predetermined timings from a position detecting device and responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to said position detecting device, characterized in that said position pointing device comprising:

timing extracting means for extracting said predetermined timings from the received alternating electric, magnetic or electromagnetic field;
control means for controlling, at preselected timings based on said predetermined timings, said responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in said alternating electric, magnetic or electromagnetic field to be sent back to said position detecting device;
a plurality of converting means for converting a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into time lengths;
counting means for counting the numbers of waves of the received alternating electric, magnetic or electromagnetic field of the predetermined frequency and for binary coding the counted value;
counting control means for successively initiating the operations of said plurality of converting means one after another at a series of timings of a predetermined time interval starting with a preselected timing based on said predetermined timings, while repeatedly initiating the operation of said counting means at said series of timings or at timings synchronized therewith; and
information holding means for holding the counted values as obtained in said counting means at moments at which the time lengths determined by said converting means expire.

7. A position pointing device according to any one of Claims 5 and 6, characterized in that the operation of said counting means is ceased when the value counted by said counting means has reached a predetermined maximum value to be measured.

8. A position pointing device having receiving means for receiving alternating electric, magnetic or electromagnetic field of a predetermined frequency radiated at predetermined timings from a position detecting device and responding means for sending alternating electric, magnetic or electromagnetic field of a desired frequency back to said position detecting device, characterized in that said position pointing device comprising:

timing extracting means for extracting said predetermined timings from the received alternating electric, magnetic or electromagnetic field;
control means for controlling, at preselected timings based on said predetermined timings, said responding means in accordance with a binary code indicative of information corresponding to an operation which is expressed by a continuous amount, so as to cause a change in said alternating electric, magnetic or electromagnetic field to be sent back to said position detecting device;
a plurality of converting means for converting a plurality of kinds of information corresponding to a plurality of kinds of information corresponding to a plurality of types of operation expressed by continuous amounts into time length;
counting means for counting the numbers of waves of the received alternating electric, magnetic or electromagnetic field of the predetermined frequency and for binary coding the counted value;
counting control means for initiating the operation of one of said plurality of converting means and then initiating the operation of the next one of said plurality of converting means at a timing at which the time length determined by said one of said plurality of converting means expires or at a timing synchronized therewith, thus sequentially initiating operations of the remainder converting means one after another, while repeatedly initiating the operation of said counting means at the timings of initiation of the successive converting means or at timings synchronized therewith; and
information holding means for holding the counted values as obtained in said counting means at moments at which the time lengths determined by said converting means expire.

9. A position pointing device according to any one of Claims 6 and 8, characterized in that the operation of said counting means is ceased at a timing at which the time length determined by the converting means which is operated last expires or at a timing synchronized therewith.

10. A position pointing device according to any one of Claims 2 and 4 to 9, characterized in that said alternating electric, magnetic or electromagnetic field of the predetermined frequency is intermittently radi-

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ated from said position detecting device over a predetermined duration at a predetermined period of repetition, and said responding means is controlled in synchronization with the suspension of radiation during the intermittent radiation of said alternating electric, magnetic or electromagnetic field.

11. A position pointing deice according to any one of Claims 2 and 4 to 9, characterized in that the radiation of said alternating electric, magnetic or electromagnetic field of the predetermined frequency from said position pointing device includes a continuous radiation conducted for a predetermined length of time or longer and a subsequent intermittent radiation conducted over a predetermined duration with a repetition period sufficiently shorter than the time length of the continuous radiation, and said responding means is controlled in synchronization with the suspension of radiation which occurs after the continuous radiation conducted for the predetermined length of time or longer.

12. A position pointing device according to any one of Claims 5 to 9, characterized in that the radiation of said alternating electric, magnetic or electromagnetic field of the predetermined frequency from said position pointing device includes a continuous radiation conducted for a predetermined length of time or longer and a subsequent intermittent radiation conducted over a predetermined duration with a repetition period sufficiently shorter than the time length of the continuous radiation, and wherein the timing of radiation of said alternating electric, magnetic or electromagnetic field from said position detecting device conducted for said predetermined length of time or longer is used as said preselected timing.

13. A position pointing device according to any one of Claims 1 to 12, characterized in that said converting means comprises an element which continuously changes its characteristic in accordance with the operation expressed by a continuous amount.

14. A position pointing device according to any one of Claims 1 to 12, characterized in that said converting means comprises a time constant circuit including an element which continuously changes its resistance, inductance or capacitance in accordance with the operation expressed by a continuous amount.

15. A position pointing device according to any one of Claims 1 to 14, characterized in that said receiving means and said responding means comprises a resonance circuit.

16. A position pointing device according to Claim 15, characterized in that said control means controls the resonance characteristic of said resonance circuit.

17. A position pointing device according to any one of Claims 15 and 16, characterized in that said position pointing device further comprising power extracting means for extracting electric energy for driving circuits in said device, from said alternating electric, magnetic or electromagnetic field of the predetermined frequency received by said resonance circuit.

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FIG. 1

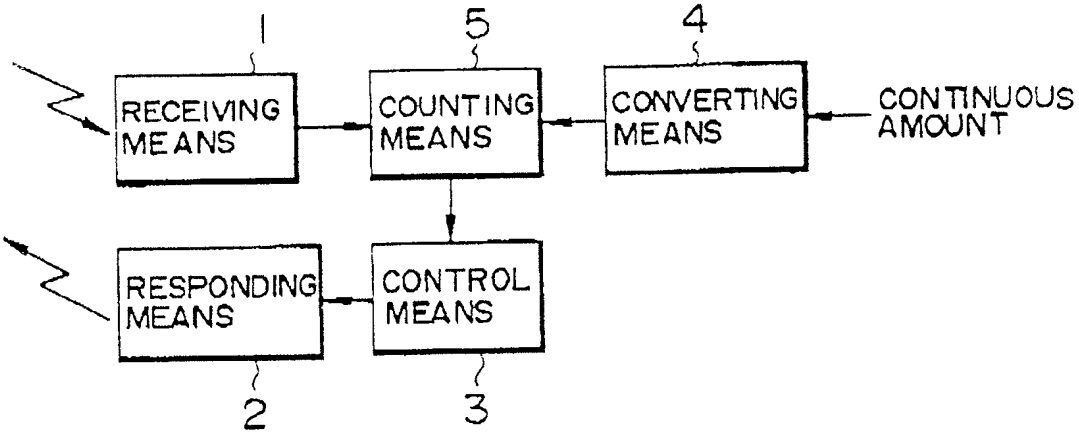
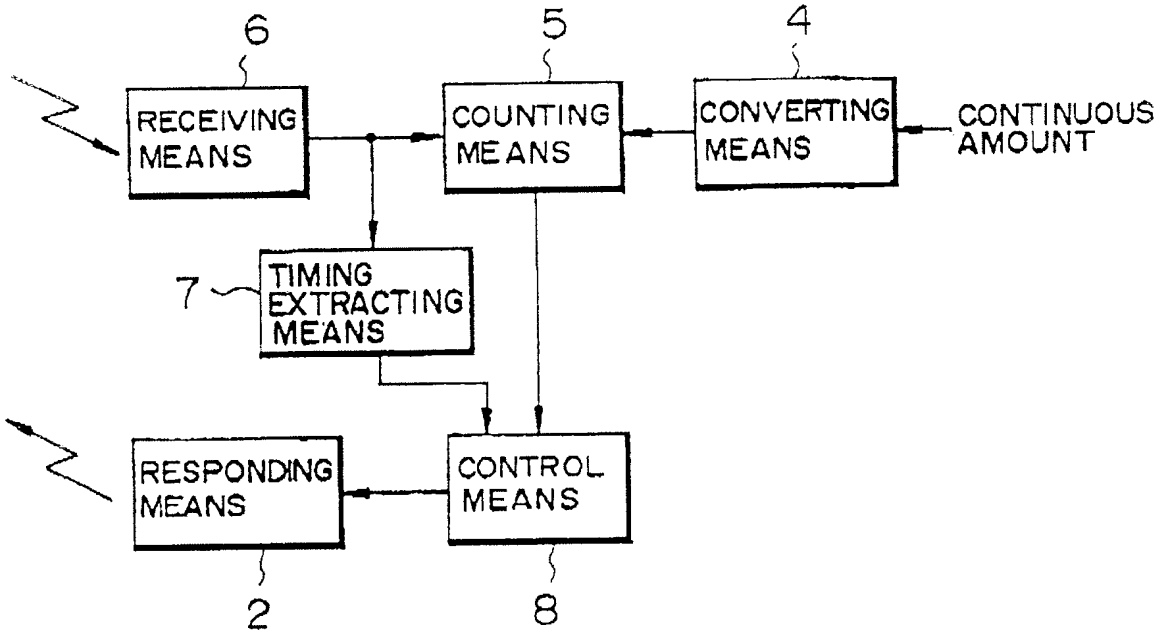
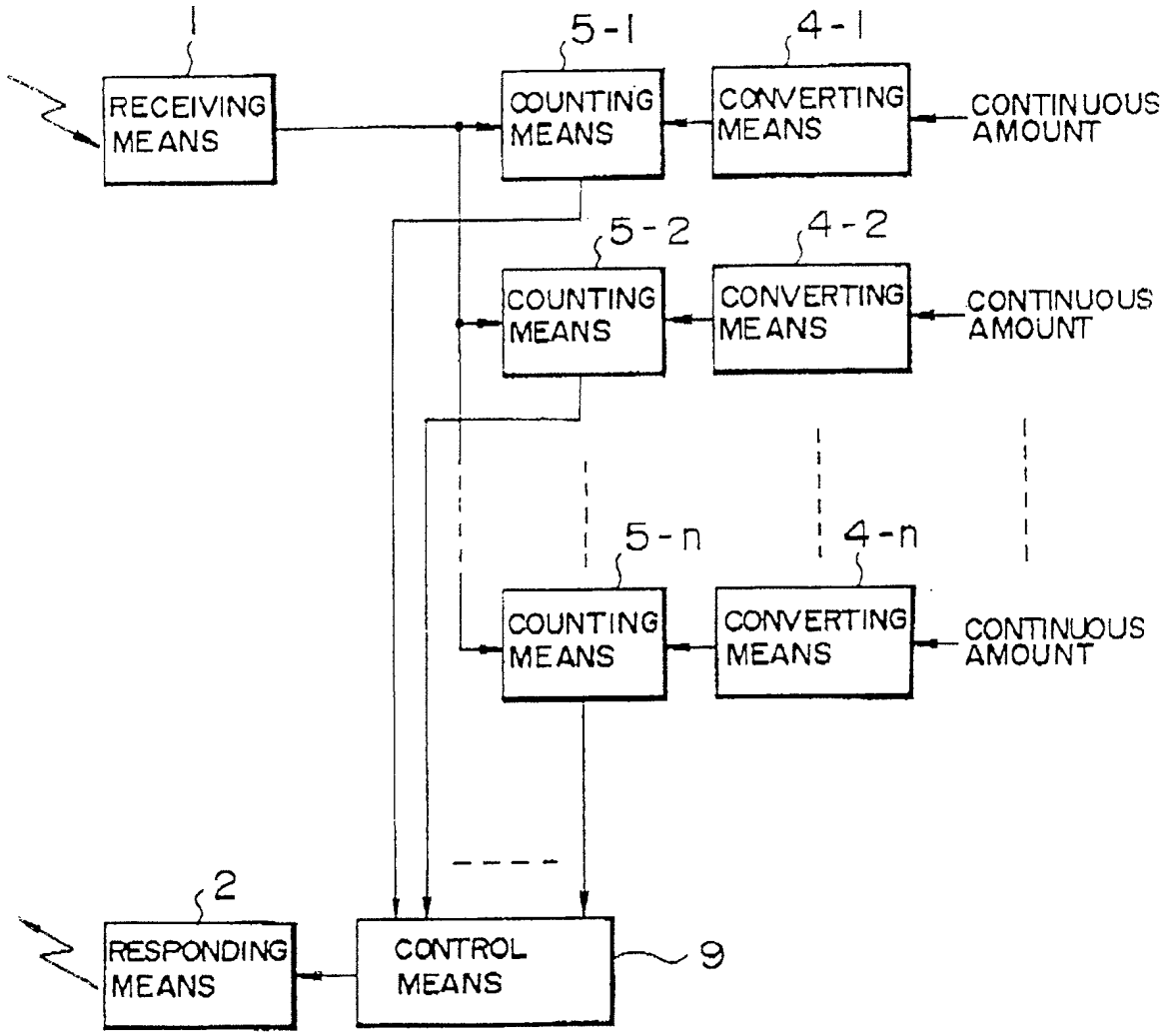


FIG. 2



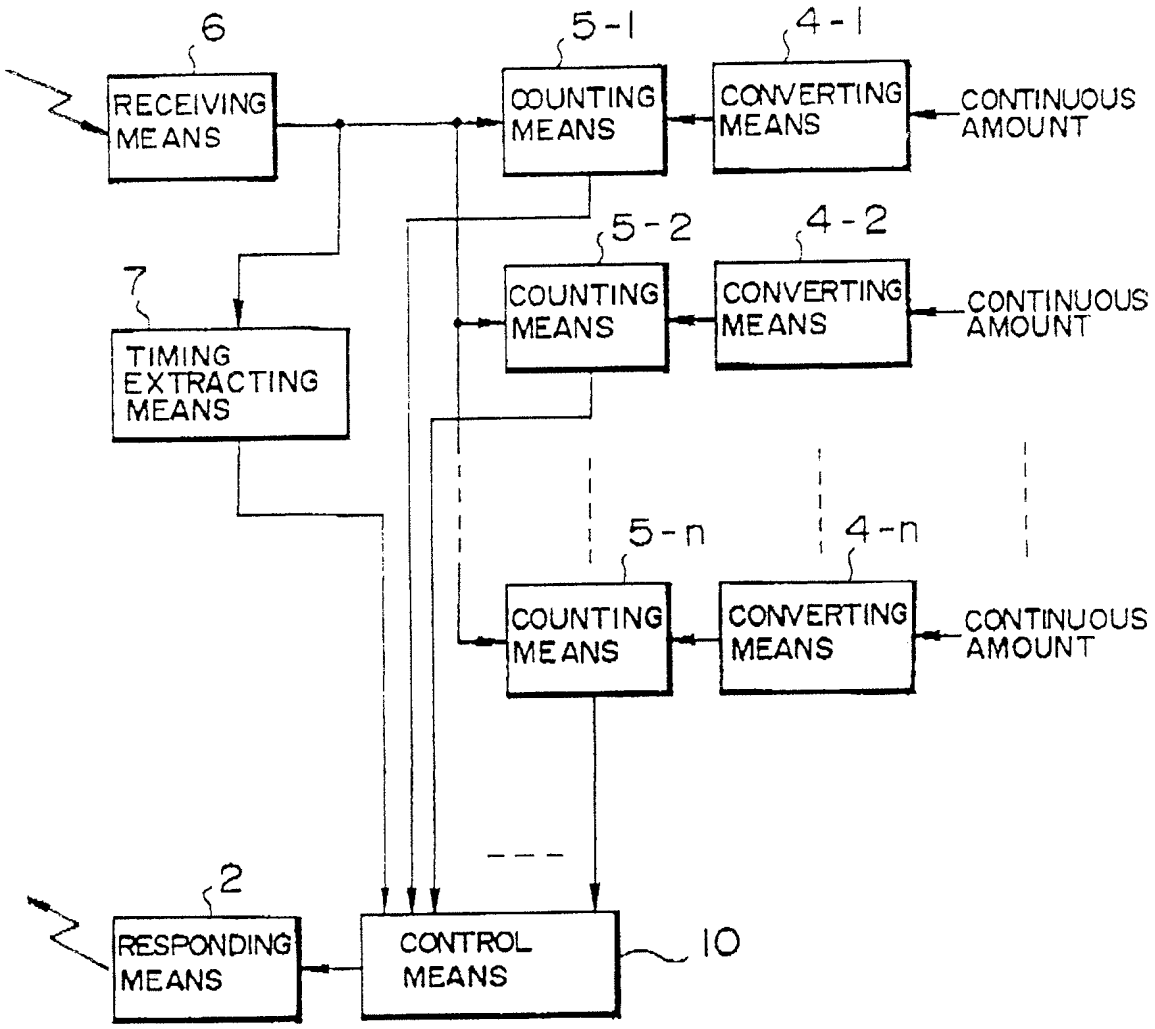
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FIG. 3



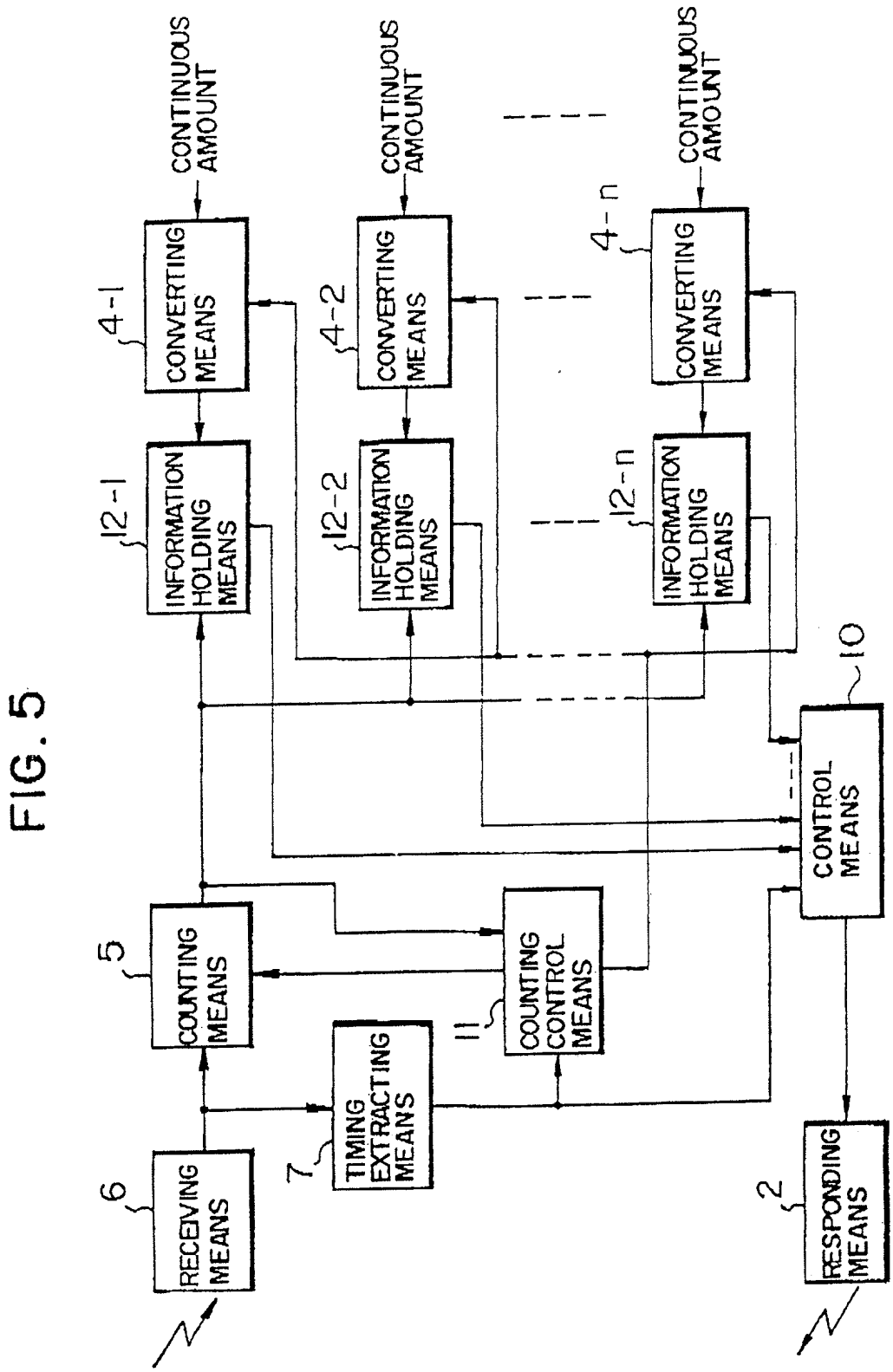
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FIG. 4



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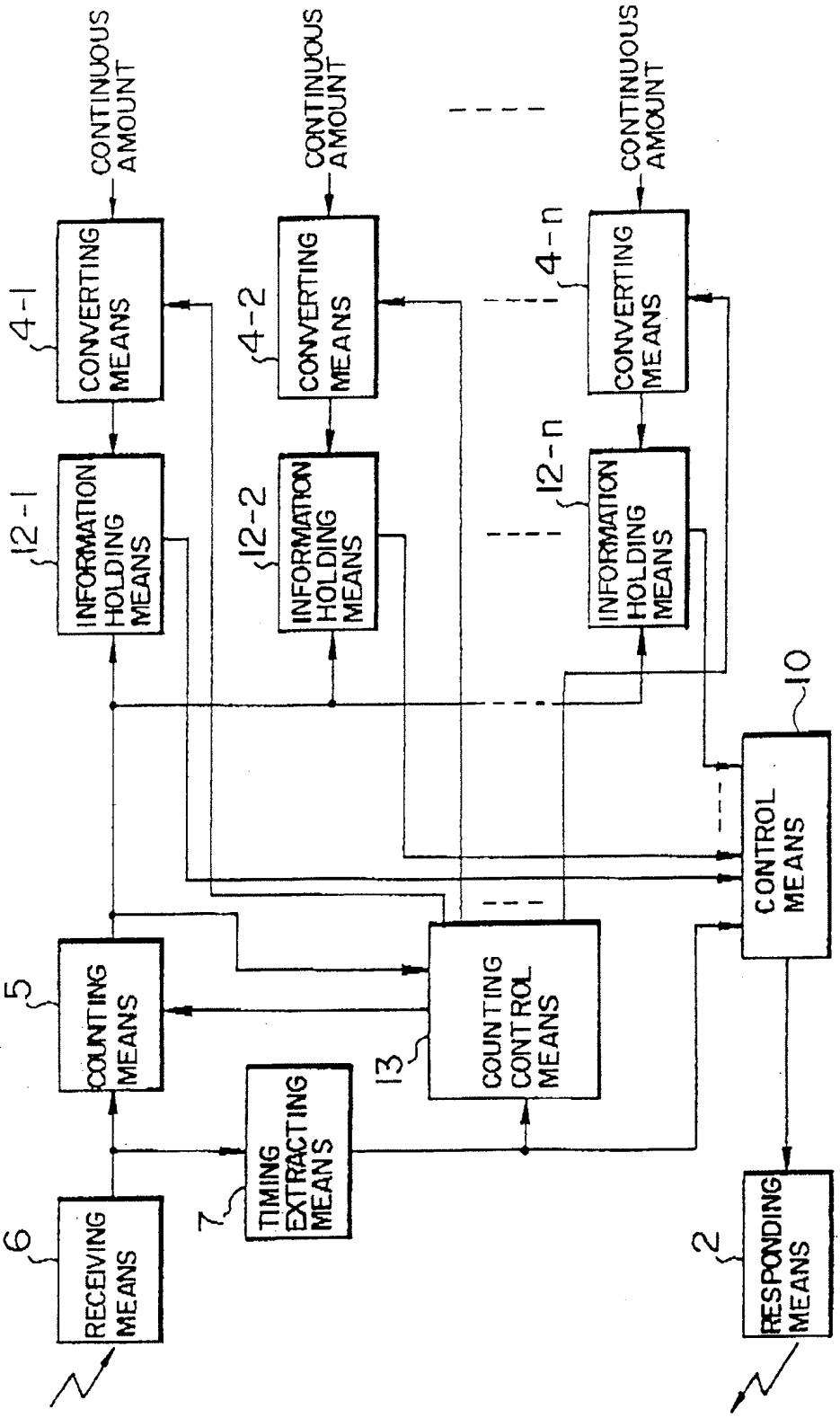
FIG. 5



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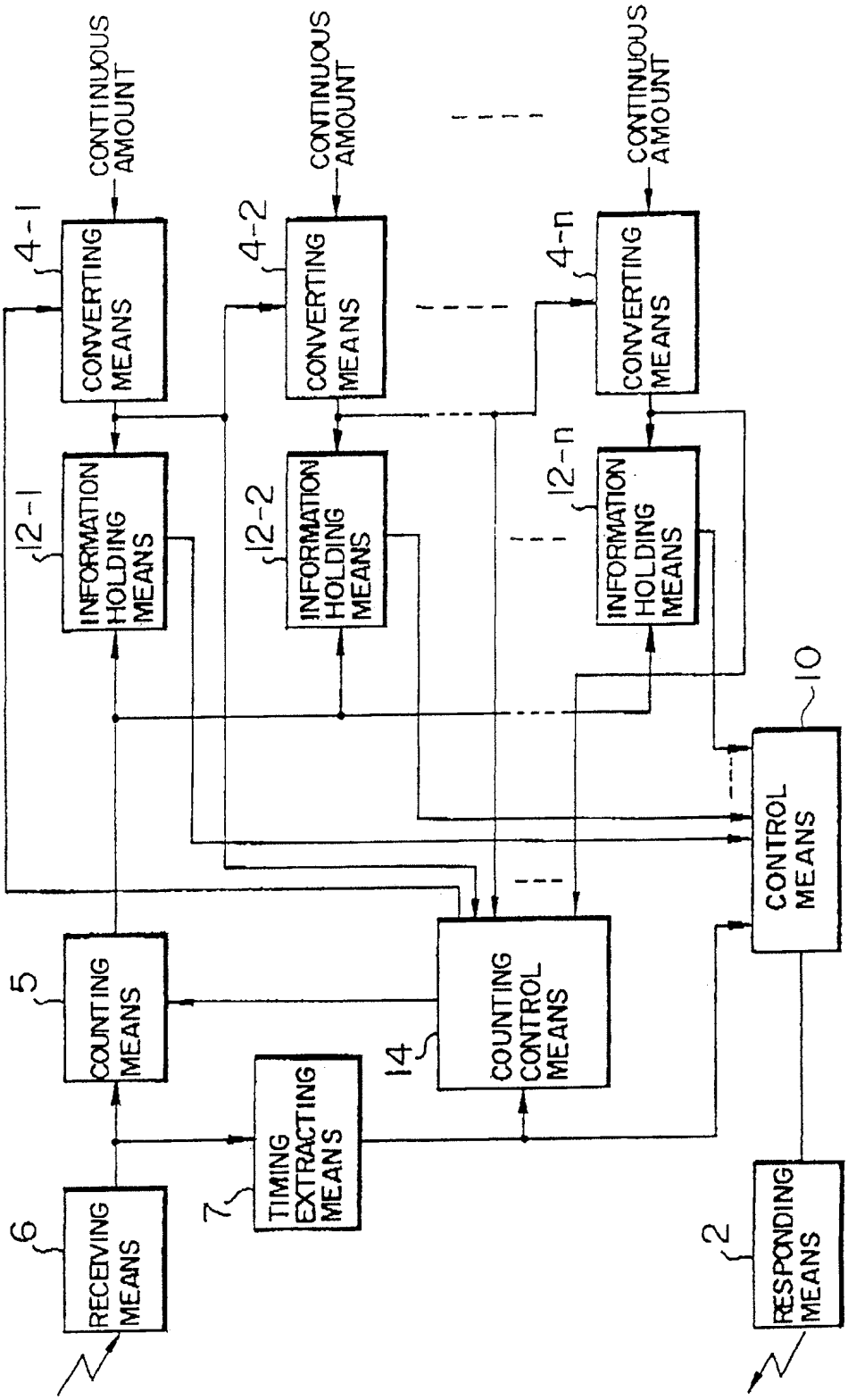
FIG. 6



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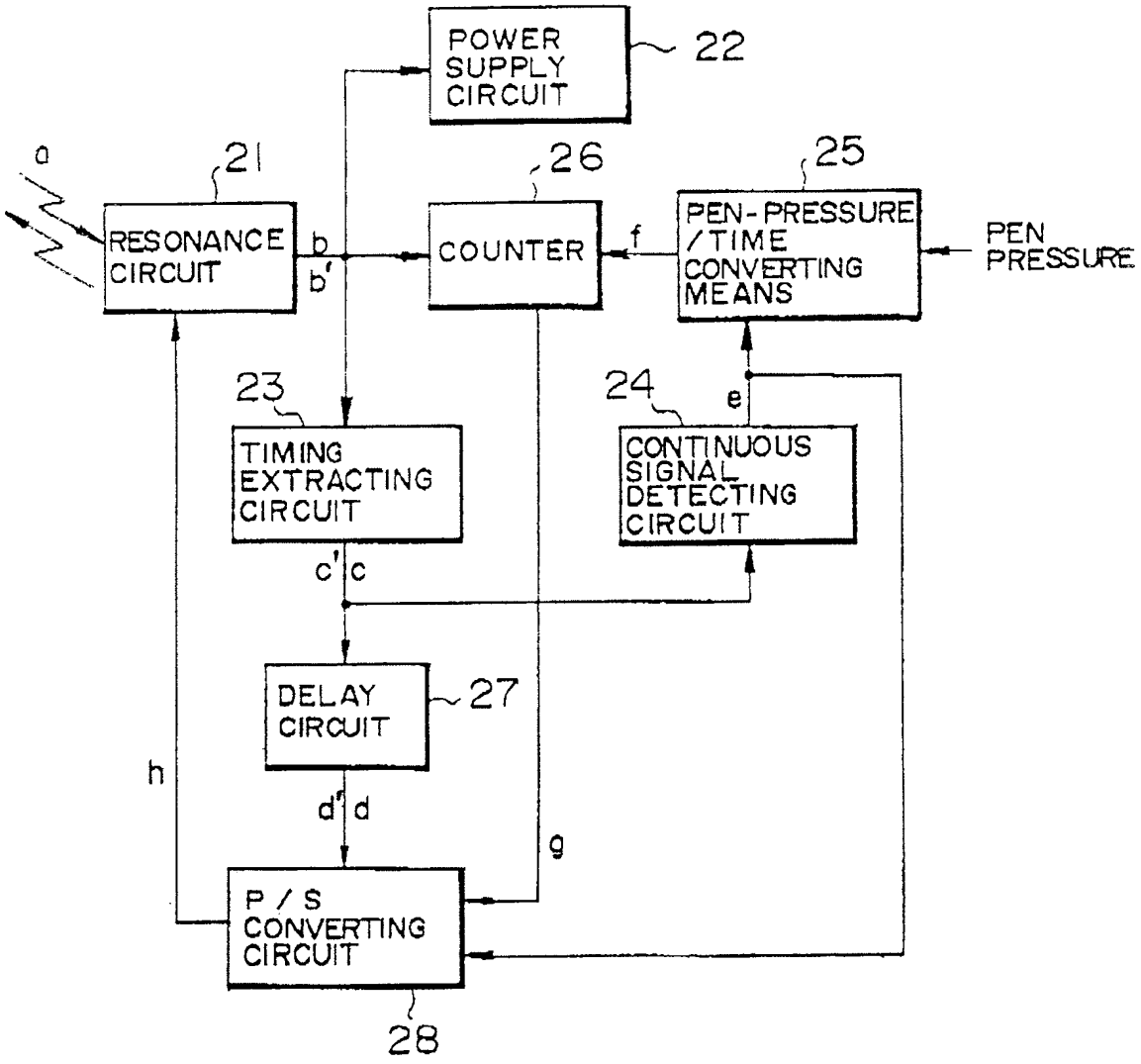
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FIG. 7



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FIG. 8



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FIG. 9

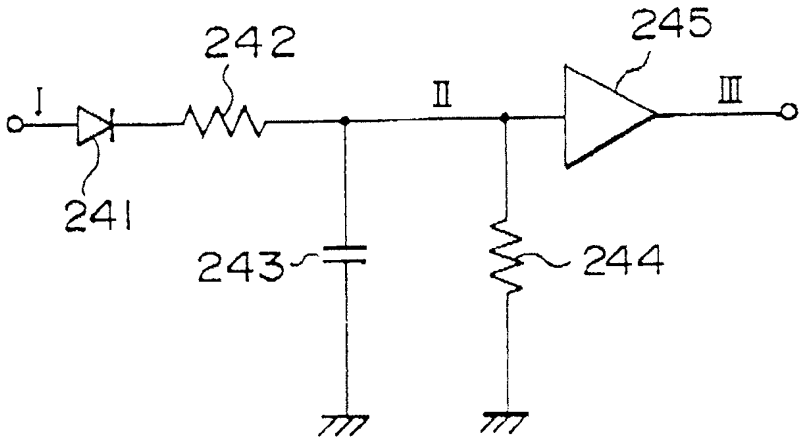
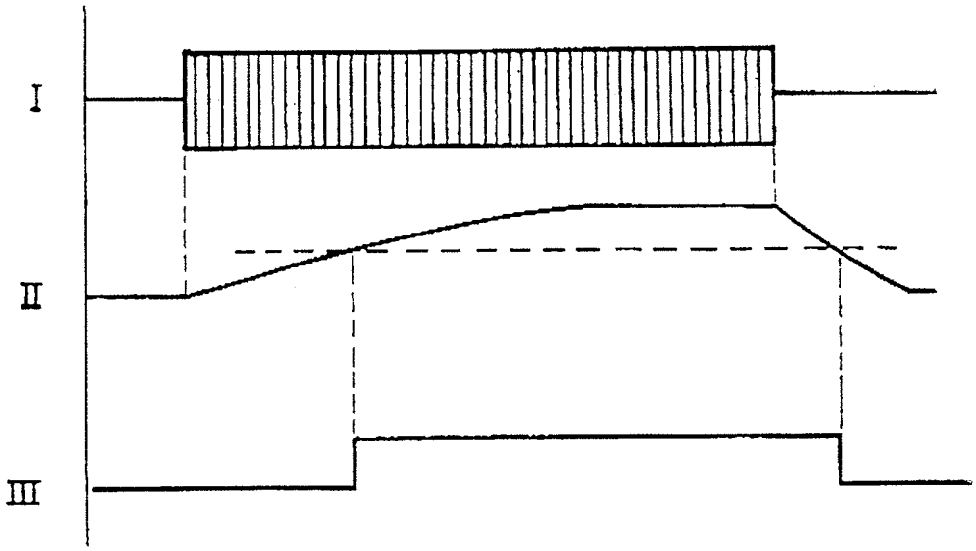


FIG. 10



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FIG. 11

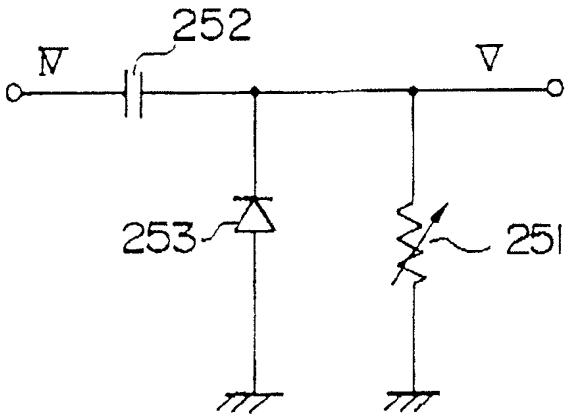
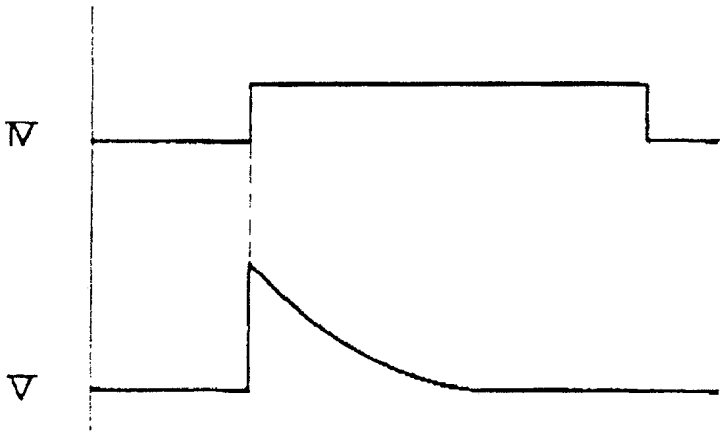
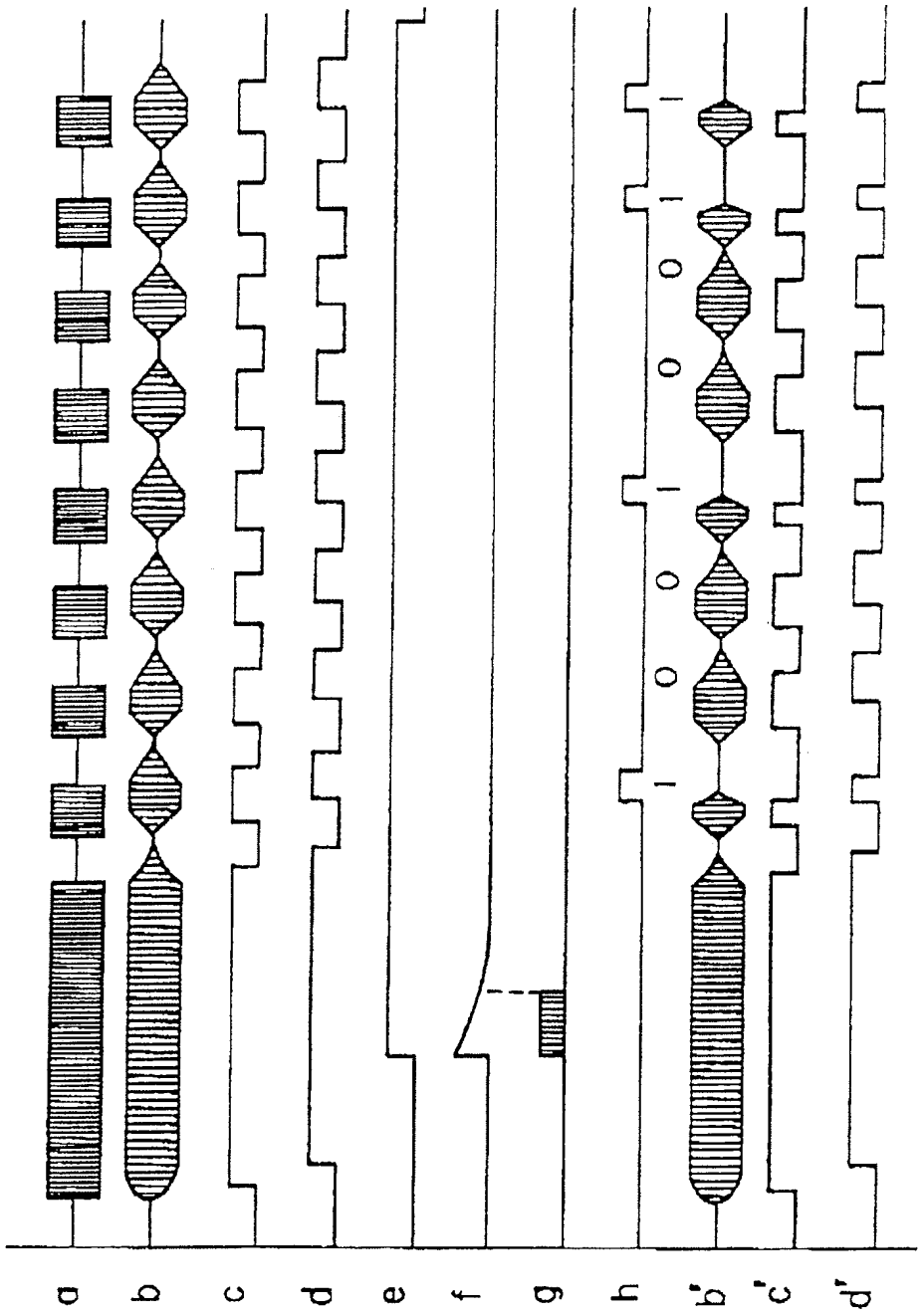


FIG. 12



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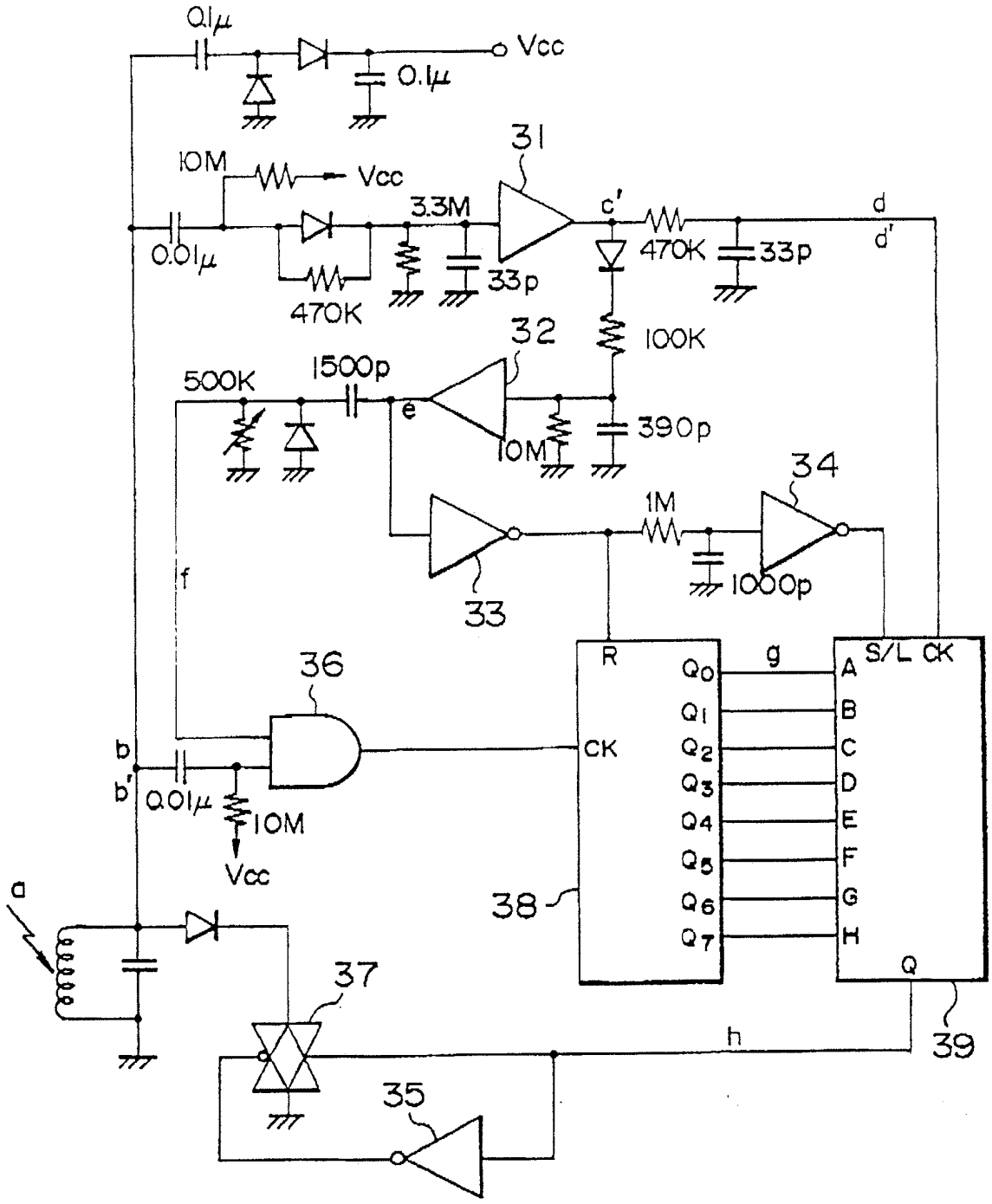
FIG. 13



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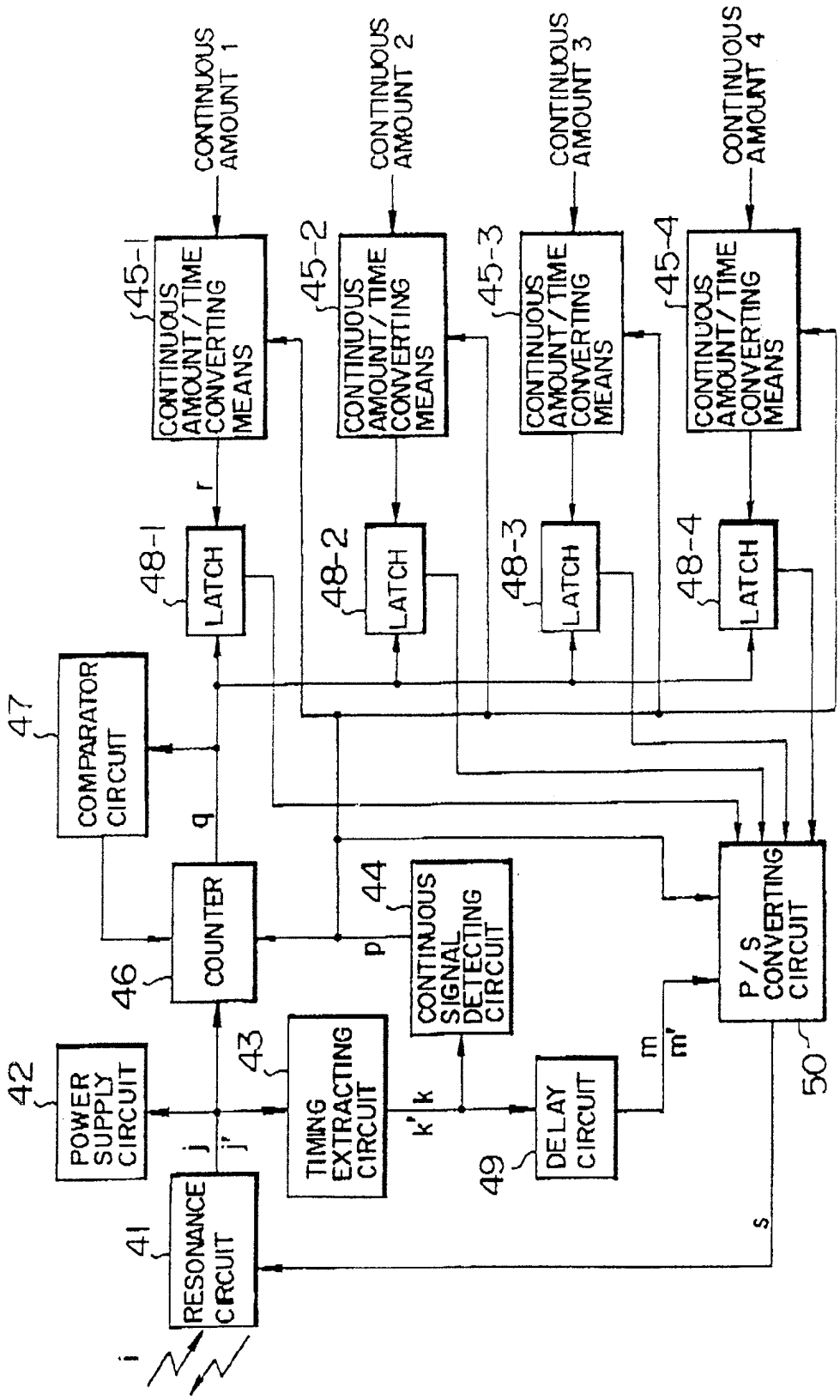
FIG.14



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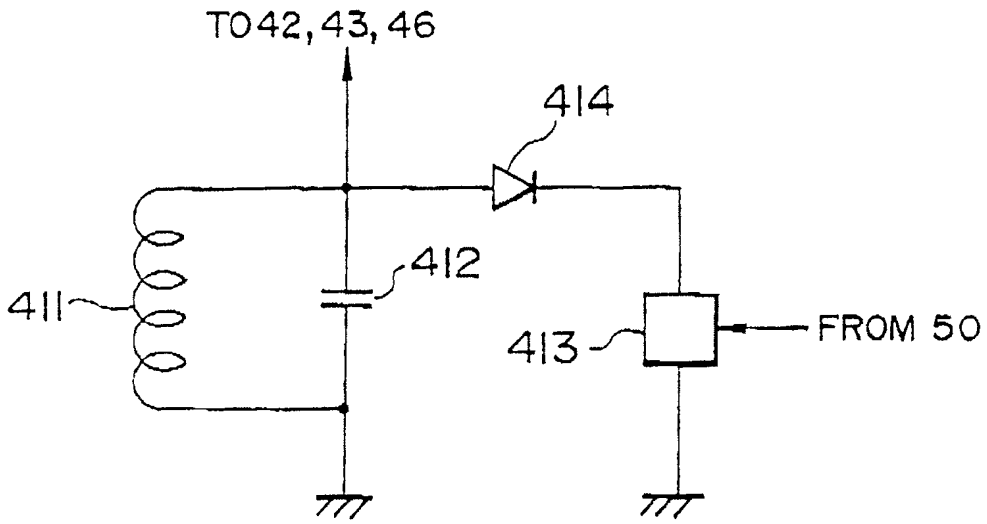
FIG. 15



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FIG. 16



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FIG. 17

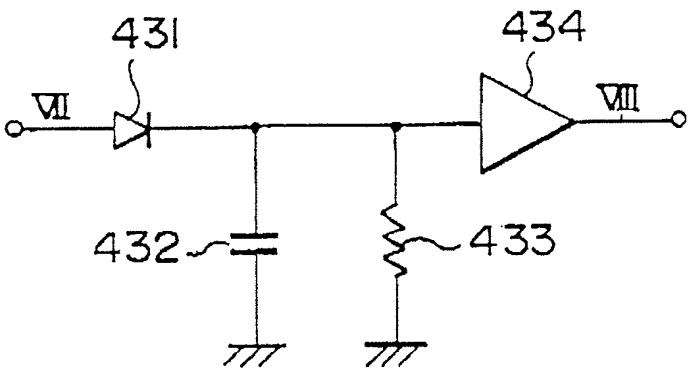
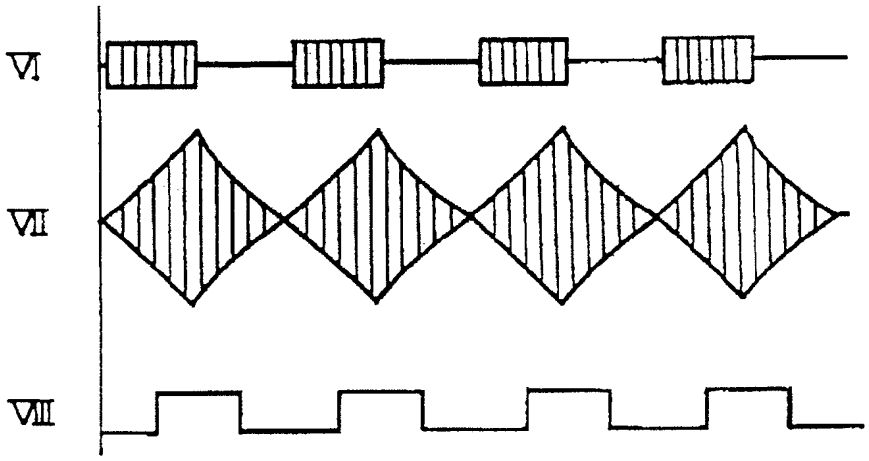


FIG. 18



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FIG. 19

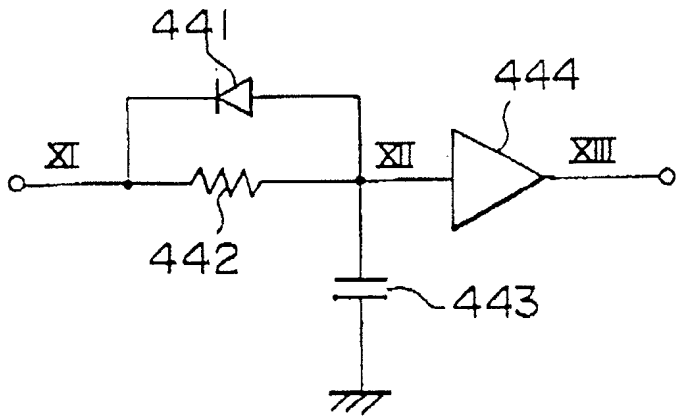
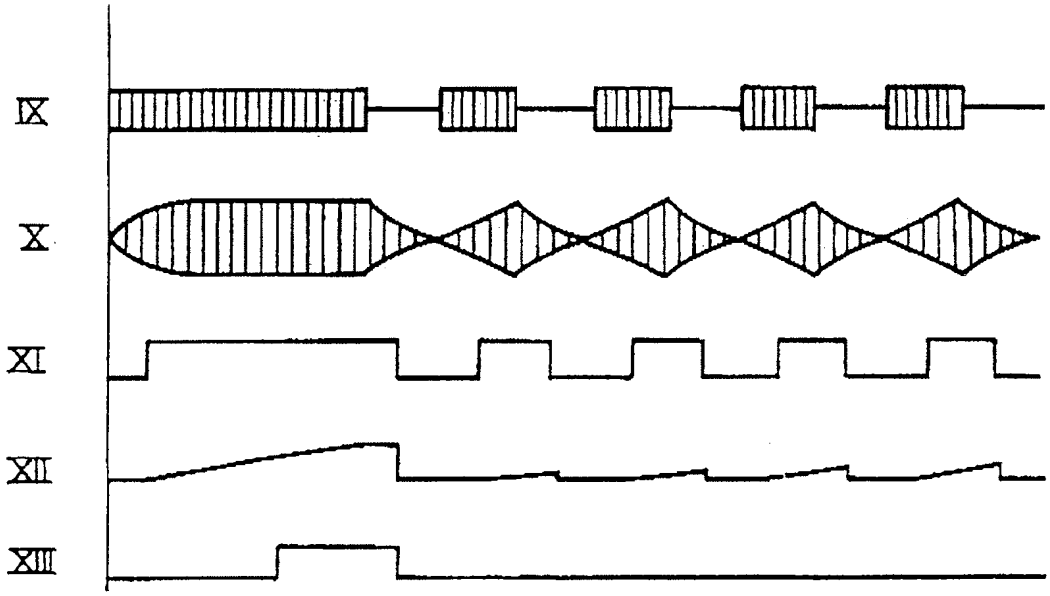


FIG. 20



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FIG. 21

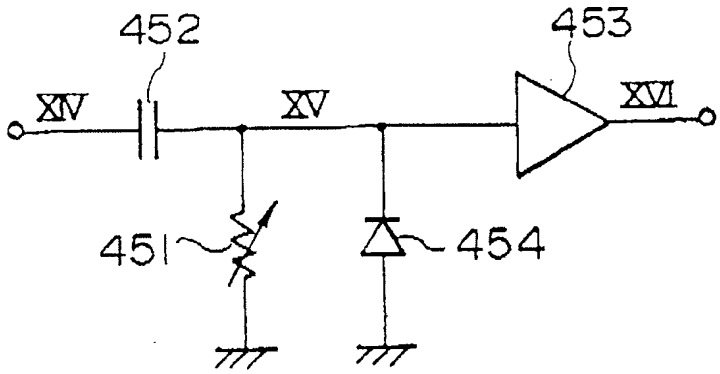
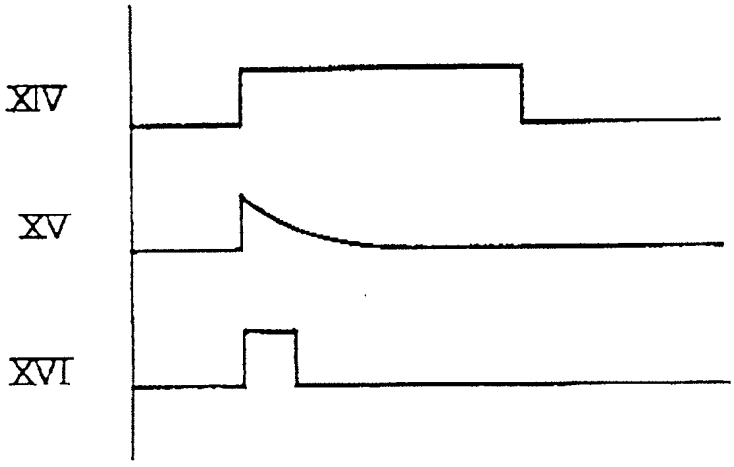


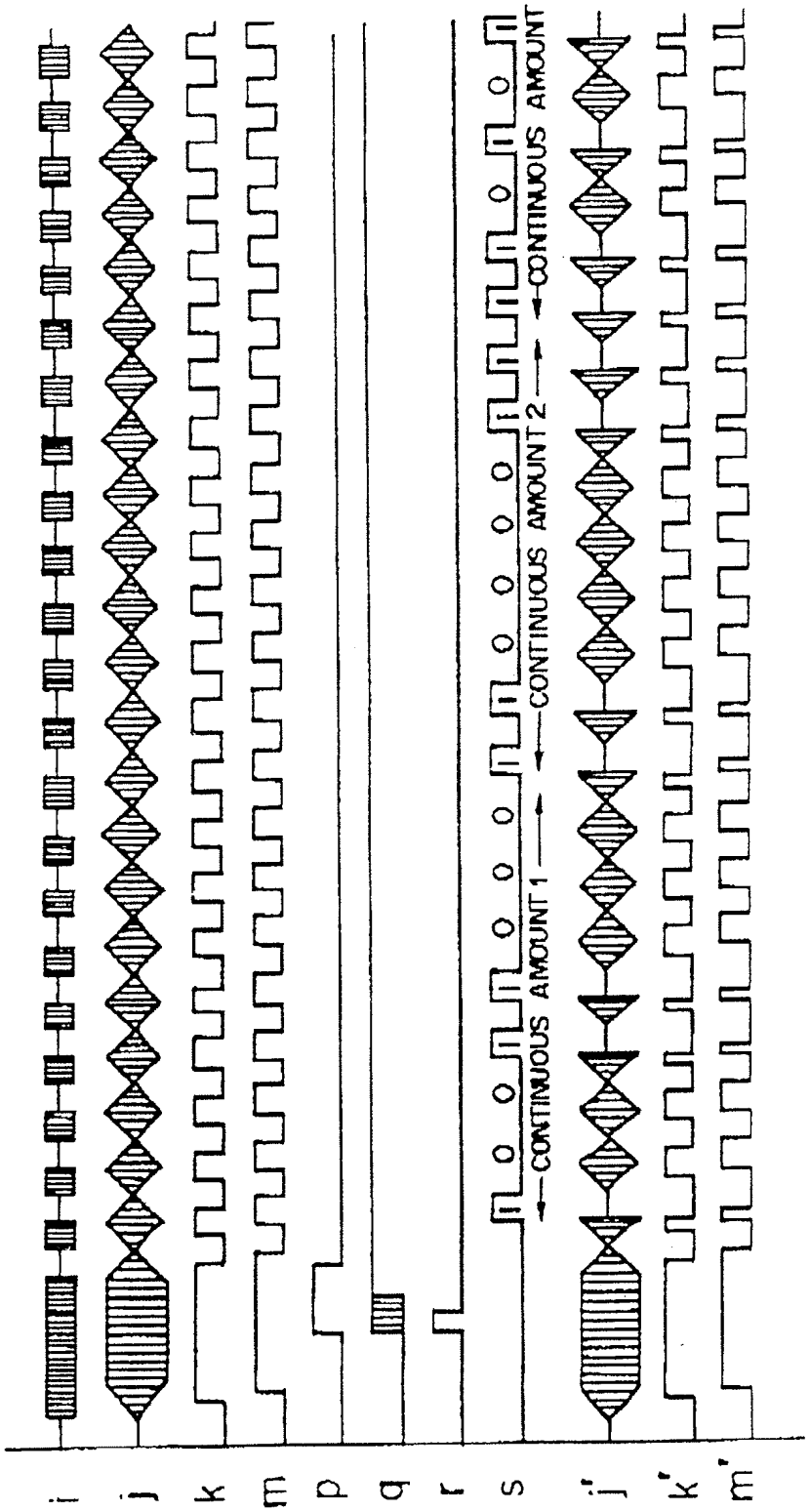
FIG. 22



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FIG. 23



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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 10 9292

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP-A-0 432 139 (WACOM COMPANY, LTD) * figures 12-17 * * page 8, line 10 - page 11, line 53 *	1-6,8, 14,15	G06K11/00 G06K11/16
A	EP-A-0 472 337 (THORN EMI) * figures 1-4 * * column 1, line 15 - line 23 * * column 2, line 28 - column 4, line 6 *	1-6,8	
A	PATENT ABSTRACTS OF JAPAN vol. 15, no. 451 (P-1276) 15 November 1991 & JP-A-03 189 717 (M. AZUMA) 19 August 1991 * abstract *	1-6, 8-12, 15-17	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

G06K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10 November 1995	Weiss, P

CATEGORY OF CITED DOCUMENTS

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Y : particularly relevant if combined with another document of the same category
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D : document cited in the application
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BNSDOCID: <EP_184_0749086A1_I_>

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Electronic Acknowledgement Receipt

EFS ID:	1656056
Application Number:	11274999
International Application Number:	
Confirmation Number:	7508
Title of Invention:	Methods and systems for detecting a position-based attribute of an object using digital codes
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Customer Number:	29906
Filer:	S. Jared Pitts/Michelle Smojver
Filer Authorized By:	S. Jared Pitts
Attorney Docket Number:	028.0013
Receipt Date:	05-APR-2007
Filing Date:	15-NOV-2005
Time Stamp:	12:29:03
Application Type:	Utility

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed	EFS_0280013_IDS.pdf	662459	no	4
Warnings:					

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Information:					
2	Foreign Reference	EFS_EP0749086A1.pdf	2189805	no	36
Warnings:					
Information:					
3	NPL Documents	EFS_ISR.pdf	271698	no	3
Warnings:					
Information:					
		Total Files Size (in bytes):	3123962		

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/122 (01-06)
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Application Number	11/274,999
Filing Date	November 15, 2005
First Named Inventor	REYNOLDS
Art Unit	2629
Examiner Name	HJERPE, RICHARD A
Attorney Docket Number	028.0013

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I am the:

☐ Applicant/Inventor

☐ Assignee of record of the entire interest.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

☑ Attorney or agent of record. Registration Number 38579.

☐ Registered practitioner named in the application transmittal letter in an application without an executed oath or declaration. See 37 CFR 1.33(a)(1). Registration Number_____.

Signature /S. Jared Pitts/

Typed or Printed Name S. Jared Pitts

Date April 11, 2007 Telephone (480) 385-5060

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☑ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	1672690
Application Number:	11274999
International Application Number:	
Confirmation Number:	7508
Title of Invention:	Methods and systems for detecting a position-based attribute of an object using digital codes
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Customer Number:	29906
Filer:	S. Jared Pitts/Michelle Smojver
Filer Authorized By:	S. Jared Pitts
Attorney Docket Number:	028.0013
Receipt Date:	13-APR-2007
Filing Date:	15-NOV-2005
Time Stamp:	14:23:49
Application Type:	Utility

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)
1	Change of Address	0280013_COCA.pdf	300584	no	2
Warnings:					

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

Information:	
Total Files Size (in bytes):	300584

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New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NUMBER	FILING OR 371(c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/274,999	11/15/2005	J. Kurth Reynolds	028.0013

CONFIRMATION NO. 7508

69819
INGRASSIA, FISHER & LORENZ, P.C.
7150 E. CAMELBACK ROAD
SUITE 325
SCOTTSDALE, AZ85251

Title: Methods and systems for detecting a position-based attribute of an object using digital codes

Publication No. US-2007-0109274-A1
Publication Date: 05/17/2007

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 703-305-3028.

Pre-Grant Publication Division, 703-605-4283

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	J. Kurth REYNOLDS	Confirmation No.: 7508
Appl. No.	:	11/274,999	
Filed	:	November 15, 2005	
Art Unit	:	2673	
Examiner	:	Unknown	
Docket No.	:	028.0013	
Title POSITION-	:	METHODS AND SYSTEMS FOR DETECTING A BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES	

PRELIMINARY AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Prior to examination, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks begin on page 9 of this paper.

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of detecting a position-based attribute of an object with respect to a touch-sensitive region comprising a plurality of electrodes, the method comprising the steps of:

~~producing a plurality of distinct digital codes used to create~~ applying a plurality of modulation signals ~~applied~~ to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the object, the plurality of modulation signals based on a plurality of distinct digital codes;

demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the object; and

determining the position-based attribute of the object with respect to the plurality of electrodes from the electrical effects.

2. (Currently Amended) The method of claim 1 wherein the determining step comprises determining a ~~identifying at least one~~ peak value of the electrical effects~~-~~.

3. (Original) The method of claim 1 wherein the determining step comprises computing a centroid of the electrical effects.

4. (Currently Amended) The method of claim 1 wherein the determining step comprises determining a difference between the electrical effects ~~received from~~ associated with at least two electrodes.

5. (Original) The method of claim 1 wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects.

6. (Original) The method of claim 1 wherein the position-based attribute corresponds to a position of the object with respect to the plurality of electrodes.

7. (Original) The method of claim 1 wherein the position-based attribute describes a motion of the object with respect to the plurality of electrodes.

8. (Currently Amended) The method of claim 1 wherein the position-based attribute describes a change in position from a previous position ~~value~~.

9. (Original) The method of claim 1 wherein the position-based attribute describes a velocity of the object.

10. (Original) The method of claim 1 wherein the position-based attribute describes an acceleration of the object.

11. (Currently Amended) The method of claim 1 wherein each of the plurality of distinct digital codes is ~~are~~ substantially orthogonal to the remainder of the plurality of distinct digital codes.

12. (Currently Amended) The method of claim 1 wherein each of the plurality of distinct digital codes is a substantial portion of a code derived from a maximum length shift register sequence.

13. (Currently Amended) The method of claim 1 wherein at least some of the plurality of distinct digital codes are selected to avoid the effects of noise in the ~~sensed signals~~ resultant signal.

14. (Original) The method of claim 1 further comprising the step of generating each of the plurality of distinct digital codes.

15. (Original) The method of claim 14 wherein the generating step comprises producing the plurality of distinct digital codes using at least one shift register.

16. (Currently Amended) The method of claim 1 wherein the applying step comprises applying modulation signals ~~are applied~~ substantially simultaneously ~~for~~ to at least two of the plurality of electrodes.

17. (Currently Amended) The method of claim 1 wherein the demodulating step comprises receiving signals from at least two of the plurality of electrodes ~~sensing signals from the sensing region~~ on a common signal path as the resultant signal.

18. (Original) The method of claim 1 wherein the electrical effects result from an electrical coupling between the object and at least some of the associated electrodes.

19. (Original) The method of claim 18 wherein the electrical coupling is a capacitive coupling.

20. (Currently Amended) The method of claim 18 wherein the resultant signal is received as electrical effects ~~are~~ obtained from an integrating capacitor coupled to at least two of the plurality of electrodes.

21. (Currently Amended) The method of claim 1 further comprising the steps of:

~~producing each of a plurality of complementary modulation signals as a function of complements of the plurality of distinct digital codes; and~~

applying a plurality of ~~each of the~~ complementary modulation signals to the associated at least one of the plurality of electrodes to obtain a plurality of complementary sensed signals, the plurality of complementary modulation signals based on complements of the plurality of distinct digital codes.

22. (Original) The method of claim 21 further comprising the steps of:

demodulating each of the plurality of complementary sensed signals using the distinct digital code associated with the at least one of the plurality of electrodes to thereby identify complementary electrical effects from the plurality of electrodes; and

comparing the electrical effects with the complementary electrical effects to thereby perform dual differential conversion.

23. (Currently Amended) The method of claim 1 further comprising the step of adjusting at least one of the distinct digital codes ~~code subsequently applied to at least one of the plurality of electrodes~~ in response to the resultant ~~plurality of sensed~~ signals.

24. (Currently Amended) The method of claim 1 further comprising the step of adjusting at least one of the ~~distinct~~ modulation signals in response to the resultant signal~~sensed signals~~.

25. (Original) The method of claim 1 further comprising the step of processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region.

26. (Original) The method of claim 25 wherein the object and the second object are separate parts of a human hand.

27. (Original) The method of claim 25 further comprising the step of rejecting information relating to the second object.

28. (Original) The method of claim 1 wherein the determining step comprises defining an image of the object.

29. (Original) The method of claim 28 wherein the image represents a two-dimensional topography of the object projected upon the touch-sensitive region.

30. (Original) The method of claim 28 further comprising the step of processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region, the second object having a second image.

31. (Original) The method of claim 30 further comprising the step of tracking movements of the image and of the second image with respect to the touch-sensitive region.

32. (Original) The method of claim 30 further comprising the step of determining whether the second image represents an undesired input, and if so, rejecting the second image.

33. (Original) The method of claim 1 wherein the distinct digital codes have more than two states.

34. (Currently Amended) The method of claim 1 wherein the applying step ~~of producing the plurality of unique modulation signals~~ comprises amplitude modulating a carrier signal with each of the plurality of distinct digital codes.

35. (Original) The method of claim 1 wherein the plurality of electrodes comprises a first plurality of electrodes having a first orientation and a second plurality of electrodes having a second orientation.

36. (Currently Amended) The method of claim 35 wherein each of the plurality of ~~unique~~ modulation signals ~~are~~ is applied to the first plurality of electrodes and received via the second plurality of electrodes.

37. (Original) The method of claim 35 further comprising the step of applying a guard signal to at least one inactive electrode of the second plurality of electrodes.

38. (Currently Amended) The method of claim 1 wherein the applying step comprises applying a same ~~at least~~ one of the ~~unique~~ plurality of modulation signals to at least two of the plurality of electrodes.

39. (Currently Amended) A touch-sensitive device for detecting a position-based attribute of an object, the device comprising:

a touch-sensitive region comprising a plurality of electrodes having electrical characteristics configured to be affected by the proximity of the object;

~~drive~~ circuitry associated with each of the electrodes;

a demodulator coupled to the touch-sensitive region; and

a processor coupled to the ~~drive~~ circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of modulation signals as a function of a plurality of distinct digital codes, to initiate application of each of the plurality of modulation signals to the ~~said~~ plurality of electrodes via the ~~drive~~ circuitry, to demodulate a sensed signal received from the touch-sensitive ~~said sensing~~ region using the digital codes

to discriminate electrical effects produced by the object upon at least one ~~sensing~~ electrode, and to determine the position-based attribute of the object with respect to the plurality of electrodes using ~~from~~ the electrical effects.

40. (Currently Amended) The device of claim 39 wherein the ~~drive~~ circuitry comprises an analog signal generator configured to generate a carrier signal and a modulator configured to amplitude modulate the carrier signal with each of the plurality of distinct digital codes to thereby produce the unique modulation signals.

41. (Original) The device of claim 39 wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user.

42. (Original) The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the electrical effects.

43. (Original) The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the positions of the plurality of electrodes relative to each other.

44. (Currently Amended) The device of claim 39 wherein presence of ~~contact between~~ the object to ~~and~~ the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes.

45. (Original) The device of claim 44 wherein the at least two of the plurality of electrodes comprise a first electrode having a first orientation and a second electrode having a second orientation substantially perpendicular to the first orientation.

46. (Original) The device of claim 39 further comprising a capacitor electrically coupled to at least some of the plurality of electrodes and to the demodulator.

47. (Original) The device of claim 46 wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes.

48. (Original) The device of claim 39 wherein the object is a finger.

49. (Original) The device of claim 39 wherein the object is a stylus.

50. (Currently Amended) The device of claim 39 wherein the electrodes are ~~touch-sensitive region is~~ formed on a flexible substrate.

51. (Currently Amended) A device for detecting a position-based attribute of an object with respect to a touch-sensitive region comprising a plurality of electrodes, the device comprising:

means for ~~producing a plurality of distinct digital codes used to create~~ applying a plurality of modulation signals ~~applied~~ to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the object, the plurality of modulation signals based on a plurality of distinct digital codes;

means for demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the object; and

means for determining the position-based attribute of the object with respect to the plurality of electrodes from the electrical effects.

REMARKS

By this Preliminary Amendment, claims 1-2, 4, 8, 11-13, 16-17, 20-21, 23-24, 34, 36, 38-40, 44, and 50-51 are amended to address informalities and not for reasons related to patentability. Therefore, no new matter has been added.

Examination on the merits is requested.

Respectfully submitted,

Dated: April 22, 2008

/S. JARED PITTS/
S. Jared Pitts
Reg. No. 38,579
Telephone: (480) 385-5060
Customer No. 69819

Electronic Acknowledgement Receipt

EFS ID:	3192555
Application Number:	11274999
International Application Number:	
Confirmation Number:	7508
Title of Invention:	Methods and systems for detecting a position-based attribute of an object using digital codes
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Customer Number:	69819
Filer:	S. Jared Pitts/Michelle Smojver
Filer Authorized By:	S. Jared Pitts
Attorney Docket Number:	028.0013
Receipt Date:	22-APR-2008
Filing Date:	15-NOV-2005
Time Stamp:	18:34:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1		0280013_PrelimAmend.pdf	95584 df12de0d7cfbe9c37ee9dc0ffa138f8de6ab469e	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Claims	2	8
	Applicant Arguments/Remarks Made in an Amendment	9	9
Warnings:			
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	Total Files Size (in bytes):	95584	

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/274,999	11/15/2005	J. Kurth Reynolds	028.0013	7508

69819 7590 01/28/2009

INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

EXAMINER	
MCCOMMAS, STUART S	
ART UNIT	PAPER NUMBER
2629	

NOTIFICATION DATE	DELIVERY MODE
01/28/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@ifllaw.com

Office Action Summary	Application No.	Applicant(s)	
	11/274,999	REYNOLDS, J. KURTH	
	Examiner	Art Unit	
	Stuart McCommas	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-2, 4, 11-19, 21-22, 33-40, 46, 48, and 51 are rejected under 35 U.S.C. 102(e) as being anticipated by Umeda et al. (United States Patent Application Publication 2005/0073324), hereinafter referenced as Umeda.

Regarding claim 1, Umeda discloses a method of detecting a position-based attribute of an object with respect to a touch-sensitive region comprising a plurality of electrodes (paragraph 88; figure 1), the method comprising the steps of:

applying a plurality of modulation signals to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the object, the plurality of modulation signals based on a plurality of distinct digital codes (paragraphs 19-20; paragraphs 88-99; paragraphs 112-125; paragraphs 131-144; paragraphs 164-175; figures 1-10);

demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the object (paragraphs 131-144; paragraphs 164-175; figures 1-10);

determining the position-based attribute of the object with respect to the plurality of electrodes from the electrical effects (paragraph 4; paragraph 88; paragraphs 19-20; paragraphs 131-144; figures 1-10).

Regarding claim 2, Umeda discloses everything as applied above, further Umeda discloses determining a peak value of the electrical effects (paragraphs 18-20; paragraphs 112-124; figures 1-10).

Regarding claim 4, Umeda discloses everything as applied above, further Umeda discloses wherein the determining step comprises determining a difference between the electrical effects associated with at least two electrodes (paragraphs 18-20; paragraphs 112-124; figures 1-10).

Regarding claim 11, Umeda discloses everything as applied above, further Umeda discloses wherein each of the plurality of distinct digital codes are substantially orthogonal to the remainder of the plurality of distinct digital codes (paragraphs 18-20; paragraphs 25-28; figures 1-10).

Regarding claim 12, Umeda discloses everything as applied above, further Umeda discloses wherein each of the plurality of distinct digital codes is a substantial portion of a code derived from a maximum length shift register sequence or M sequence (paragraphs 18-20; paragraphs 25-28; paragraphs 104-109; paragraphs 143-145; figures 1-10).

Regarding claim 13, Umeda discloses everything as applied above, further Umeda discloses wherein at least some of the plurality of distinct digital codes are selected to avoid the effects of noise in the resultant signal (paragraphs 18-20;

paragraphs 25-28; paragraphs 143-145; figures 1-10).

Regarding claim 14, Umeda discloses everything as applied above, further Umeda discloses generating each of the plurality of distinct digital codes (paragraphs 18-20; paragraphs 25-28; paragraphs 103-104; paragraphs 143-145; figures 1-10).

Regarding claim 15, Umeda discloses everything as applied above, further Umeda discloses producing the plurality of distinct digital codes using at least one shift register (paragraphs 25-28; paragraphs 103-109; paragraphs 143-145; figures 1-10).

Regarding claim 16, Umeda discloses everything as applied above, further Umeda discloses wherein the applying step comprises applying modulation signals substantially simultaneously to at least two of the plurality of electrodes (paragraphs 103-109; figures 1-10).

Regarding claim 17, Umeda discloses everything as applied above, further Umeda discloses wherein the demodulating step comprises receiving signals from at least two of the plurality of electrodes on a common signal path as the resultant signal (paragraphs 103-119; paragraphs 127-137; figures 1-10).

Regarding claim 18, Umeda discloses everything as applied above, further Umeda discloses wherein the electrical effects result from an electrical coupling between the object and at least some of the associated electrodes (paragraph 4-7; figures 1-10).

Regarding claim 19, Umeda discloses everything as applied above, further Umeda discloses wherein the electrical coupling is a capacitive coupling (paragraphs 4-7; paragraph 13; figures 1-10).

Regarding claim 21, Umeda discloses everything as applied above, further Umeda discloses applying a plurality of each of the complementary modulation signals to the associated at least one of the plurality of electrodes to obtain a plurality of complementary sensed signals, the plurality of complementary modulation signals based on complements of the plurality of distinct digital codes (paragraphs 112-125; figures 1-10).

Regarding claim 22, Umeda discloses everything as applied above, further Umeda discloses demodulating each of the plurality of complementary sensed signals using the distinct digital code associated with the at least one of the plurality of electrodes to thereby identify complementary electrical effects from the plurality of electrodes, and comparing the electrical effects with the complementary electrical effects to thereby perform dual differential conversion (paragraphs 112-144; figures 1-10).

Regarding claim 33, Umeda discloses everything as applied above, further Umeda discloses wherein the distinct digital codes have more than two states depending on the digital code that is generated (paragraphs 25-28; paragraphs 103-109; paragraphs 143-145; figures 1-10).

Regarding claim 34, Umeda discloses everything as applied above, further Umeda discloses wherein the applying comprises amplitude modulating a carrier signal which is a DC carrier signal with each of the plurality of distinct digital codes (paragraphs 18-20; paragraphs 104-108; figures 1-10).

Regarding claim 35, Umeda discloses everything as applied above, further Umeda discloses wherein the plurality of electrodes comprises a first plurality of electrodes having a first orientation and a second plurality of electrodes having a second orientation (figures 1-4).

Regarding claim 36, Umeda discloses everything as applied above, further Umeda discloses wherein each of the plurality of modulation signals is applied to the first plurality of electrodes and received via the second plurality of electrodes (figures 1-4).

Regarding claim 37, Umeda discloses everything as applied above, further Umeda discloses applying a guard signal to at least one inactive electrode of the second plurality of electrodes (paragraphs 99-107; paragraphs 112-120; figures 1-10).

Regarding claim 38, Umeda discloses everything as applied above, further Umeda discloses wherein the applying step comprises applying a same one of the plurality of modulation signals to at least two of the plurality of electrodes (paragraphs 107-109; figures 1-10).

Regarding claim 39, Umeda discloses a touch-sensitive device for detecting a position-based attribute of an object (paragraph 88), the device comprising:

a touch-sensitive region comprising a plurality of electrodes having electrical characteristics configured to be affected by the proximity of the object (paragraph 88; figures 1-4);

circuitry associated with each of the electrodes (figures 1-4);

a demodulator (100) coupled to the touch-sensitive region (figures 1-4);

a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of modulation signals as a function of a plurality of distinct digital codes, to initiate application of each of the plurality of modulation signals to the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the digital codes to discriminate electrical effects produced by the object upon at least one electrode, and to determine the position-based attribute of the object with respect to the plurality of electrodes using the electrical effects (paragraphs 19-20; paragraphs 88-99; paragraphs 112-125; paragraphs 131-144; figures 1-10).

Regarding claim 40, Umeda discloses everything as applied above, further Umeda discloses wherein the circuitry comprises an analog signal generator configured to generate a carrier signal and a modulator configured to amplitude modulate the carrier signal with each of the plurality of distinct digital codes to thereby produce the unique modulation signals (paragraphs 18-20; paragraphs 104-108; figures 1-10).

Regarding claim 46, Umeda discloses everything as applied above, further Umeda discloses a capacitor electrically coupled to at least some of the plurality of electrodes and to the demodulator (figures 1-5).

Regarding claim 48, Umeda discloses everything as applied above, further Umeda wherein the object is a finger (figures 1-4).

Regarding claim 51, Umeda discloses a device for detecting a position-based attribute of an object with respect to a touch-sensitive region comprising a plurality of electrodes (figures 1-4), the device comprising:

means for applying a plurality of modulation signals to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the object, the plurality of modulation signals based on a plurality of distinct digital codes (paragraphs 19-20; paragraphs 88-99; paragraphs 112-125; paragraphs 131-144; paragraphs 165-175; figures 1-10);

means for demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the object (paragraphs 131-144; paragraphs 164-175; figures 1-10);

means for determining the position-based attribute of the object with respect to the plurality of electrodes from the electrical effects (paragraph 4; paragraph88; paragraphs 19-20; paragraphs 131-144; figures 1-10).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3, 5-8 and 49-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Gillespie et al. (United States Patent 5,880,411), hereinafter referenced as Gillespie.

Regarding claim 3, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the determining step comprises computing a centroid of the electrical effects.

In a similar field of invention Gillespie discloses wherein the determining step comprises computing a centroid of the electrical effects (column 13 lines 19-27).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the determining step comprises computing a centroid of the electrical effects for the purpose of precisely calculating the position of the finger on the touch sensitive area.

Regarding claim 5, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects.

In a similar field of invention Gillespie discloses wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects (column 22 lines 53-67; column 23 lines 1-34).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the determining step comprises comparing the electrical effects to previously-

determined baseline effects for the purpose of precisely calculating the position of the finger on the touch sensitive area.

Regarding claim 6, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the position-based attribute corresponds to a position of the object with respect to the plurality of electrodes.

In a similar field of invention Gillespie discloses wherein the position-based attribute corresponds to a position of the object with respect to the plurality of electrodes (column 9 lines 3-35; figure 1).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the position-based attribute corresponds to a position of the object with respect to the plurality of electrodes for the purpose of precisely calculating the position of the finger on the touch sensitive area to perform calculations on the provided information.

Regarding claim 7, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the position-based attribute describes a motion of the object with respect to the plurality of electrodes.

In a similar field of invention Gillespie discloses wherein the position-based attribute describes a motion of the object with respect to the plurality of electrodes (column 44 lines 49-54; figure 1; figure 17D).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the position-based attribute describes a motion of the object with respect to the

plurality of electrodes for the purpose of precisely determining the position of the finger and its activity on the touch sensitive area to perform calculations on the provided information.

Regarding claim 8, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the position-based attribute describes a change in position from a previous position.

In a similar field of invention Gillespie discloses wherein the position-based attribute describes a change in position from a previous position (column 27 lines 24-55; figure 1).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the position-based attribute describes a change in position from a previous position for the purpose of precisely determining the position of the finger and its activity on the touch sensitive area to perform calculations on the provided information.

Regarding claim 49, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the object is a stylus.

In a similar field of invention Gillespie discloses wherein the object is a stylus (column 4 lines 42-46).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the object is a stylus for the purpose of allowing a user to utilize a stylus in a

position based input system to input information including biometric information such as a signature.

Regarding claim 50, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the electrodes are formed on a flexible substrate.

In a similar field of invention Gillespie discloses wherein the electrodes are formed on a flexible substrate (column 9 lines 36-44).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the electrodes are formed on a flexible substrate for the purpose of allowing a user to use the sensor board in a flexible manner such as in a hand.

5. Claims 9, 28-29, and 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Benkley III (United States Patent Application Publication 2004/0081339), hereinafter referenced as Benkley.

Regarding claim 9, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the position-based attribute describes a velocity of the object.

In a similar field of invention Benkley discloses wherein the position-based attribute describes a velocity of the object (paragraph 21).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Benkley by specifically providing wherein the position-based attribute describes a velocity of the object for the purpose of

precisely calculating the position of the finger on the touch sensitive area as it is moved across the touch sensitive area.

Regarding claim 28, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the determining step comprises defining an image of the object.

In a similar field of invention Benkley discloses wherein the determining step comprises defining an image of the object (paragraphs 53-54).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Benkley by specifically providing wherein the determining step comprises defining an image of the object for the purpose of precisely calculating the position of the finger on the touch sensitive area as it is moved across the touch sensitive area (paragraphs 53-54).

Regarding claim 29, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the image represents a two- dimensional topography of the object projected upon the touch-sensitive region.

In a similar field of invention Benkley discloses wherein the image represents a two-dimensional topography of the object projected upon the touch-sensitive region (paragraphs 53-54).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Benkley by specifically providing wherein the image represents a two- dimensional topography of the object projected upon the touch-sensitive region for the purpose of precisely calculating the position of the finger

on the touch sensitive area as it is moved across the touch sensitive area (paragraphs 53-54).

Regarding claim 44, Umeda discloses everything as applied above, however Umeda fails to disclose wherein presence of the object to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes.

In a similar field of invention Benkley discloses wherein presence of the object to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes (paragraphs 60-64; figures 2A-2B).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Benkley by specifically providing wherein presence of the object to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes for the purpose of precisely calculating the finger print for precise biometric identification (paragraphs 53-54).

Regarding claim 45, Umeda and Benkley, the combination discloses everything as applied above, further Umeda discloses wherein the at least two of the plurality of electrodes comprise a first electrode having a first orientation and a second electrode having a second orientation substantially perpendicular to the first orientation (figures 1-4).

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Zadesky et al. (United States Patent Application Publication 2003/0076306), hereinafter referenced as Zadesky.

Regarding claim 10, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the position-based attribute describes an acceleration of the object.

In a similar field of invention Zadesky discloses wherein the position-based attribute describes an acceleration of the object (paragraph 41).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Zadesky by specifically providing wherein the position-based attribute describes an acceleration of the object for the purpose of precisely identifying input from a user.

7. Claims 20 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Iwasaki et al. (United States Patent 6,621,487), hereinafter referenced as Iwasaki.

Regarding claim 20, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes.

In a similar field of invention Iwasaki discloses wherein the resultant signal is received as electrical effects obtained from an integrating capacitor Cs coupled to at least two of the plurality of electrodes (column 6 lines 54-67; column 7 lines 1-17; figures 1-2).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Iwasaki by specifically providing wherein

the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes for the purpose of precisely identifying input from a user.

Regarding claim 47, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes.

In a similar field of invention Iwasaki discloses wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes (column 6 lines 54-67; column 7 lines 1-17; figures 1-2).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Iwasaki by specifically providing wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes for the purpose of precisely identifying input from a user.

8. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Ozluturk et al. (United States Patent 7,106,720), hereinafter referenced as Ozluturk.

Regarding claim 23, Umeda discloses everything as applied above, however Umeda fails to disclose adjusting at least one of the distinct digital codes in response to the resultant signals.

In a similar field of invention Ozluturk discloses adjusting at least one of the distinct digital codes in response to the resultant signals (column 5 lines 23-67; column 6 lines 1-12; figures 3-4).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Ozluturk by specifically providing adjusting at least one of the distinct digital codes in response to the resultant signals for the purpose of adjusting signals based on the channel conditions to improve the performance of receiving and demodulating signals to speed up the system (column 4 lines 24-34).

Regarding claim 24, Umeda discloses everything as applied above, however Umeda fails to disclose adjusting at least one of the modulation signals in response to the resultant sensed signals.

In a similar field of invention Ozluturk discloses adjusting at least one of the modulation signals in response to the resultant sensed signals when the code is adjusted (column 5 lines 23-67; column 6 lines 1-12; figures 3-4).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Ozluturk by specifically providing adjusting at least one of the modulation signals in response to the resultant sensed signals for the purpose of adjusting signals based on the channel conditions to improve the performance of receiving and demodulating signals to speed up the system (column 4 lines 24-34).

9. Claims 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Bisset et al. (United States Patent 5,825,352), hereinafter referenced as Bisset.

Regarding claim 25, Umeda discloses everything as applied above, however Umeda fails to disclose processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region.

In a similar field of invention Bisset discloses processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region (column 5 lines 6-60; figures 1-9).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Bisset by specifically providing processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region for the purpose of allowing multiple fingers to be used on a touch pad to input information quickly.

Regarding claim 26, Umeda and Bisset, the combination discloses everything as applied above, further Bisset discloses wherein the object and the second object are separate parts of a human hand (column 5 lines 6-60; figures 1-9).

Regarding claim 27, Umeda and Bisset, the combination discloses everything as applied above, further Bisset discloses rejecting information relating to the second object when the second objects peak value is not above the threshold value necessary for a finger to be considered present (column 5 lines 6-60; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

10. Claims 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Benkley and further in view of Bisset.

Regarding claim 30, Umeda and Benkley, the combination discloses everything as applied above, however the combination fails to disclose processing the resultant signal to obtain information about a second object in proximity to the touch- sensitive region, the second object having a second image.

In a similar field of invention Bisset discloses processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region, the second object having a second image (column 5 lines 6-60; column 7 lines 1-34; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda and Benkley with Bisset by specifically processing the resultant signal to obtain information about a second object in proximity to the touch- sensitive region, the second object having a second image for the purpose of allowing multiple fingers to be used on a touch pad to input information quickly.

Regarding claim 31, Umeda, Benkley and Bisset, the combination discloses everything as applied above, further Bisset discloses tracking movements of the image and of the second image with respect to the touch-sensitive region (column 5 lines 6-60; column 7 lines 1-34; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

Regarding claim 32, Umeda, Benkley and Bisset, the combination discloses everything as applied above, further Bisset discloses determining whether the second image represents an undesired input, and if so, rejecting the second image if the peak

input is below a threshold(column 5 lines 6-60; column 7 lines 1-34; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

11. Claims 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Yoshikawa et al. (United States Patent Application Publication 2003/0067449), hereinafter referenced as Yoshikawa.

Regarding claim 41, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user.

In a similar field of invention Yoshikawa discloses wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user (paragraph 8; paragraphs 83-90; figures 1-2).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Yoshikawa by specifically providing wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user for the purpose of providing feedback to a user to let the use know that input is being received (paragraphs 6-7; paragraph 25).

Regarding claim 42, Umeda and Yoshikawa, the combination discloses everything as applied above, further Yoshikawa discloses wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the electrical effects (paragraphs 24-33; paragraphs 81-90; figures 1-8).

Regarding claim 43, Umeda and Yoshikawa, the combination discloses everything as applied above, further Yoshikawa discloses wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the positions of the plurality of electrodes relative to each other (paragraphs 24-33; paragraphs 81-90; figures 1-8).

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stuart McCommas whose telephone number is (571)270-3568. The examiner can normally be reached on Monday-Friday 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on (571)272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sumati Lefkowitz/
Supervisory Patent Examiner, Art Unit 2629

Stuart McCommas
Patent Examiner
Art Unit 2629

SSM

Notice of References Cited	Application/Control No. 11/274,999	Applicant(s)/Patent Under Reexamination REYNOLDS, J. KURTH	
	Examiner Stuart McCommas	Art Unit 2629	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2005/0073324	04-2005	Umeda et al.	324/662
*	B	US-5,880,411	03-1999	Gillespie et al.	178/18.01
*	C	US-2004/0081339	04-2004	Benkley, Fred G. III	382/124
*	D	US-2003/0076306	04-2003	Zadesky et al.	345/173
*	E	US-6,621,487	09-2003	Iwasaki et al.	345/173
*	F	US-7,106,720	09-2006	Ozluturk et al.	370/342
*	G	US-5,825,352	10-1998	Bisset et al.	345/173
*	H	US-2003/0067449	04-2003	Yoshikawa et al.	345/173
	I	US-			
	J	US-			
	K	US-			
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
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NON-PATENT DOCUMENTS

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Stuart McCommas	2629

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/15/2009								
	1	✓								
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	34	✓								
	35	✓								
	36	✓								

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	**Art Unit**
	Stuart McCommas	2629

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/15/2009								
	37	✓								
	38	✓								
	39	✓								
	40	✓								
	41	✓								
	42	✓								
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	49	✓								
	50	✓								
	51	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Stuart McCommas	2629

SEARCHED			
Class	Subclass	Date	Examiner
345	173	1/15/2009	SSM

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Search Attached	1/15/2009	SSM

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

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Filing Date	2005-11-15
First Named Inventor	J. Kurth REYNOLDS
Art Unit	2673
Examiner Name	
Attorney Docket Number	028.0013

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/S.M./	1	5880411		1999-03-09	GILLESPIE et al.	

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/S.M./	1	20050150697		2005-07-14	ALTMAN et al.	

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/S.M./	1	0749086A1	EP		1996-12-18	WACOM CO., LTD.		☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	11274999
	Filing Date	2005-11-15
	First Named Inventor	J. Kurth REYNOLDS
	Art Unit	2673
	Examiner Name	
	Attorney Docket Number	028.0013

/S.M./	1	International Search Report for International Application No. PCT/US2006/040266, mailed March 30, 2007.	☐

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Sheet 1 of 3

Complete if Known	
Application Number	
Filing Date	11/15/2005
First Named Inventor	J. Kurth Reynolds
Art Unit	
Examiner Name	
Attorney Docket Number	028.0013

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/S.M./		US- 4,170,025	10-02-1979	Benkley et al.	
		US- 4,459,541	07-10-1984	Fielden et al.	
		US- 5,305,017	04-19-1994	Gerpheide	
		US- 5,666,113	09-09-1997	Logan	
		US- 5,790,106	08-04-1998	Hirano et al.	
		US- 5,825,352	10-20-1998	Bisset et al.	
		US- 5,861,875	01-19-1999	Gerpheide	
		US- 5,917,906	06-29-1999	Thornton	
		US- 6,570,557 B1	05-27-2003	Westerman et al.	
		US- 6,704,005 B2	03-09-2004	Kato et al.	
		US- 6,771,280 B2	08-03-2004	Fujisaki et al.	
		US- 6,788,288 B2	09-07-2004	Ano	
		US- 2003/0030628 A1	02-13-2003	Sato et al.	
		US- 2003/0035570 A1	02-20-2003	Benkley, III	
		US- 2004/0081339 A1	04-29-2004	Benkley, III	
		US- 2005/0005703 A1	01-13-2005	Saito et al.	
		US- 2005/0024065 A1	02-03-2005	Umeda et al.	
		US- 2005/0052425 A1	03-10-2005	Zadesky et al.	
		US- 2005/0073324 A1	04-07-2005	Umeda et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
/S.M./		WO 02/47018 A2	06-13-2002	Metro Engineering Assoc.		
/S.M./		WO 2004/107146 A2	12-09-2004	Therefore Limited		

Examiner Signature	/Stuart Mccommas/	Date Considered	01/15/2009

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Sheet 2 of 3

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Application Number	
Filing Date	11/15/2005
First Named Inventor	J. Kurth Reynolds
Art Unit	
Examiner Name	
Attorney Docket Number	028.0013

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/S.M./	028	US- 2002/0049070 A1	04-25-2002	Bick	
/S.M./		US- 2005/0122785 A1	06-09-2005	Umeda et al.	
		US-			
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Examiner Signature	/Stuart Mccommas/	Date Considered	01/15/2009

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Sheet 3 of 3

Complete if Known	
Application Number	
Filing Date	11/15/2005
First Named Inventor	J. Kurth Reynolds
Art Unit	
Examiner Name	
Attorney Docket Number	028.0013

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
/S.M./		SMITH, ET AL.; "Code-Division Multiplexing of a Sensor Channel: A Software Implementation"; IEEE Journal; April, 1999; pp 725-731; Vol. 17, No. 4.	
/S.M./		CICHOCKI, ET AL.; "A Switched-Capacitor Interface for Capacitive Sensors Based on Relaxation Oscillators"; IEEE Journal; October, 1990; pp 797-799; Vol. 39, No. 5.	
/S.M./		HUANG, ET AL.; "Electronic Transducers for Industrial Measurement of Low Value Capacitances"; J. Phys. E: Sci. Instrum. 21 1988; pp 242-250; IOP Publishing Printed in the U.K.	
/S.M./		PHILIPP, HAL; "Charge Transfer Sensing", pp 1-9; Copyright 1997.	
/S.M./		ZIMMERMAN, ET AL.; "Applying Electric Field Sensing to Human-Computer Interfaces", MIT Media Laboratory; pp 1-8; to be published in (IEEE SIG) CHI May 1995.	
/S.M./		YAMADA, ET AL.; "A Switched-Capacitor Interface for Capacitive Pressure Sensors", IEEE Journal; Feburary, 1992; pp 81-86; Vol. 41, No. 1.	
/S.M./		SMITH, ET AL.; "Electric Field Sensing for Graphical Interfaces"; IEEE Computer Graphics and Applications; May/June 1998; pp 54-60.	
/S.M./		VIGODA, BENJAMIN; "A Nonlinear Dynamic System for Spread Spectrum Code Acquisition"; MIT Media Laboratory; pp 10-90.	

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CONFIRMATION NO. 7508

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/274,999	11/15/2005	345	2629	028.0013

APPLICANTS
J. Kurth Reynolds, Sunnyvale, CA;

**** CONTINUING DATA ***************************

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
12/14/2005

Foreign Priority claimed	☐ Yes ☑ No	☐ Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
35 USC 119(a-d) conditions met	☐ Yes ☑ No					
Verified and Acknowledged	/STUART S MCCOMMAS/ Examiner's Signature	Initials	CA	5	51	3

ADDRESS

INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253
UNITED STATES

TITLE

Methods and systems for detecting a position-based attribute of an object using digital codes

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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	"20040081339"	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 13:20
L2	2	"20040081339" and speed	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 13:21
L3	2	"20040081339" and image	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 13:28
L4	2	"20040081339" and coupling	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 13:32
L5	0	"20030076306" and acceleratin	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 13:47
L6	2	"20030076306" and acceleration	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 13:47
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L8	1	"7106720".pn. and code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 13:58
L9	1	"5825352".pn.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 14:05
L10	0	"5825352".pn. and reject	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 14:11
L11	0	"5825352".pn. and cancel	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 14:11
L12	0	"5825352".pn. and ignore	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 14:11

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S3	68	345/173.ccls. and mouse and signature and identity	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:42

S4	33	345/173.ccls. and mouse and signature and biometric	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:47
S5	53	345/173.ccls. and handwriting recognition and biometric	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:47
S6	78	345/173.ccls. and handwriting recognition and touchpad	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:50
S7	10	345/173.ccls. and handwriting recognition with touchpad	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:50
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S9	0	identity verification with touchpad	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:53
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S14	60	345/173.ccls. and touchpad and signature	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 16:00
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S17	33	("4196358" | "4616325" | "4656585" | "4812828" | "5150120" | "5187481" | "5260697" | "5266750" | "5287121" | "5327161" | "5376946" | "5420943" | "5446371" | "5488204" | "5508719" | "5543590" | "5543591" | "5568409").PN. OR ("5995084").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 16:23
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S20	1	S19 and angle and pressure and direction	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 17:41
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S24	107	345/173.ccls. and (direction with pressure) and angle	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 17:45
S25	66	345/173.ccls. and (direction with pressure) and angle and stylus	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 17:45
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S30	1	"6,414,671".pn.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 18:03
S31	0	"6,414,671".pn. and angle with pressure	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 18:03

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S33	222	345/173.ccls. and pressure with direction	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 18:11
S34	92	345/173.ccls. and angle with stylus	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 18:12
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S38	21	("5049862" | "5105338" | "5241303" | "5559942" | "5587560" | "5629499" | "5737740" | "5917493" | "6259043" | "6351259" | "6362440").PN. OR ("6504956").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 18:19
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S43	0	stylus angle with presser	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 18:23
S44	19	stylus angle with pressure	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 18:23
S45	14	(US-20010030644-$ or US-20050162398-$ or US-20020196237-$ or US-20030222856-$). did. or (US-5995084-$ or US-6396483-$ or US-6335726-$ or US-6509847-$ or US-7064750-$ or US-6307955-$ or US-5280527-$ or US-5852260-$ or US-5880411-$ or US-5422959-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/01/14 11:04
S46	7	S45 and speed	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/14 11:04
S47	0	"5995084".pn. and pda	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/14 11:36
S48	1	"5995084".pn. and personal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/14 11:36
S49	0	"20050073324" and motion	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 09:36
S50	0	"20050073324" and move	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 09:36
S51	2	"20050073324" and orthogonality	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 09:38
S52	2	"20050073324" and shift register	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 09:43
S53	0	"20050073324" and shift register sequence	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 09:43
S54	2	"20050073324" and capacitive	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 10:03

S55	0	"20050073324" and complement	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 10:06
S56	0	"20050073324" and invert	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 10:06
S57	0	"20050073324" and inversiion	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 10:06
S58	2	"20050073324" and fingerprint	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 11:15
S59	1	"5850411".pn.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 11:20
S60	1	"5880411".pn. and centroid	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 11:25
S61	1	"5880411".pn. and baseline	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 11:29
S62	1	"5880411".pn. and position	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 11:33
S63	1	"5880411".pn. and speed	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 11:36
S64	1	"5880411".pn. and change with position	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 11:41
S65	1	"5880411".pn. and stylus and flexible	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/15 11:45

1/15/2009 3:01:51 PM
C:\Documents and Settings\smccommas\My Documents\EAST\Workspaces\11280112signaturemouse.wsp

UTILITY PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	J. Kurth REYNOLDS	Confirmation No.: 7508
Appl. No.	:	11/274,999	
Filed	:	November 15, 2005	
Art Unit	:	2673	
Examiner	:	Unknown	
Docket No.	:	028.0013	
Title	:	METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES	

AMENDMENT AND RESPONSE

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

In response to the Office Action mailed January 28, 2009, please amend the above-identified application as follows:

A **Listing of Claims** begins on page 2 of this paper.

Remarks/Arguments begin on page 10 of this paper.

Listing of Claims

This Response does not change the claims or specification. The following is a listing of the claims that are currently-pending:

1. (Previously Presented) A method of detecting a position-based attribute of an object with respect to a touch-sensitive region comprising a plurality of electrodes, the method comprising the steps of:

applying a plurality of modulation signals to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the object, the plurality of modulation signals based on a plurality of distinct digital codes;

demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the object; and

determining the position-based attribute of the object with respect to the plurality of electrodes from the electrical effects.

2. (Previously Presented) The method of claim 1 wherein the determining step comprises determining a peak value of the electrical effects.

3. (Original) The method of claim 1 wherein the determining step comprises computing a centroid of the electrical effects.

4. (Previously Presented) The method of claim 1 wherein the determining step comprises determining a difference between the electrical effects associated with at least two electrodes.

5. (Original) The method of claim 1 wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects.

6. (Original) The method of claim 1 wherein the position-based attribute corresponds to a position of the object with respect to the plurality of electrodes.

7. (Original) The method of claim 1 wherein the position-based attribute describes a motion of the object with respect to the plurality of electrodes.

8. (Previously Presented) The method of claim 1 wherein the position-based attribute describes a change in position from a previous position.

9. (Original) The method of claim 1 wherein the position-based attribute describes a velocity of the object.

10. (Original) The method of claim 1 wherein the position-based attribute describes an acceleration of the object.

11. (Previously Presented) The method of claim 1 wherein each of the plurality of distinct digital codes is substantially orthogonal to the remainder of the plurality of distinct digital codes.

12. (Previously Presented) The method of claim 1 wherein each of the plurality of distinct digital codes is a substantial portion of a code derived from a maximum length shift register sequence.

13. (Previously Presented) The method of claim 1 wherein at least some of the plurality of distinct digital codes are selected to avoid the effects of noise in the resultant signal.

14. (Original) The method of claim 1 further comprising the step of generating each of the plurality of distinct digital codes.

15. (Original) The method of claim 14 wherein the generating step comprises producing the plurality of distinct digital codes using at least one shift register.

16. (Previously Presented) The method of claim 1 wherein the applying step comprises applying modulation signals substantially simultaneously to at least two of the plurality of electrodes.

17. (Previously Presented) The method of claim 1 wherein the demodulating step comprises receiving signals from at least two of the plurality of electrodes on a common signal path as the resultant signal.

18. (Original) The method of claim 1 wherein the electrical effects result from an electrical coupling between the object and at least some of the associated electrodes.

19. (Original) The method of claim 18 wherein the electrical coupling is a capacitive coupling.

20. (Previously Presented) The method of claim 18 wherein the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes.

21. (Previously Presented) The method of claim 1 further comprising the steps of:

applying a plurality of complementary modulation signals to the associated at least one of the plurality of electrodes to obtain a plurality of complementary sensed signals, the plurality of complementary modulation signals based on complements of the plurality of distinct digital codes.

22. (Original) The method of claim 21 further comprising the steps of:

demodulating each of the plurality of complementary sensed signals using the distinct digital code associated with the at least one of the plurality of electrodes to thereby identify complementary electrical effects from the plurality of electrodes; and

comparing the electrical effects with the complementary electrical effects to thereby perform dual differential conversion.

23. (Previously Presented) The method of claim 1 further comprising the step of adjusting at least one of the distinct digital codes in response to the resultant signals.

24. (Previously Presented) The method of claim 1 further comprising the step of adjusting at least one of the modulation signals in response to the resultant signal.

25. (Original) The method of claim 1 further comprising the step of processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region.

26. (Original) The method of claim 25 wherein the object and the second object are separate parts of a human hand.

27. (Original) The method of claim 25 further comprising the step of rejecting information relating to the second object.

28. (Original) The method of claim 1 wherein the determining step comprises defining an image of the object.

29. (Original) The method of claim 28 wherein the image represents a two-dimensional topography of the object projected upon the touch-sensitive region.

30. (Original) The method of claim 28 further comprising the step of processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region, the second object having a second image.

31. (Original) The method of claim 30 further comprising the step of tracking movements of the image and of the second image with respect to the touch-sensitive region.

32. (Original) The method of claim 30 further comprising the step of determining whether the second image represents an undesired input, and if so, rejecting the second image.

33. (Original) The method of claim 1 wherein the distinct digital codes have more than two states.

34. (Previously Presented) The method of claim 1 wherein the applying step comprises amplitude modulating a carrier signal with each of the plurality of distinct digital codes.

35. (Original) The method of claim 1 wherein the plurality of electrodes comprises a first plurality of electrodes having a first orientation and a second plurality of electrodes having a second orientation.

36. (Previously Presented) The method of claim 35 wherein each of the plurality of modulation signals is applied to the first plurality of electrodes and received via the second plurality of electrodes.

37. (Original) The method of claim 35 further comprising the step of applying a guard signal to at least one inactive electrode of the second plurality of electrodes.

38. (Previously Presented) The method of claim 1 wherein the applying step comprises applying a same one of the plurality of modulation signals to at least two of the plurality of electrodes.

39. (Previously Presented) A touch-sensitive device for detecting a position-based attribute of an object, the device comprising:

a touch-sensitive region comprising a plurality of electrodes having electrical characteristics configured to be affected by the proximity of the object;

circuitry associated with each of the electrodes;

a demodulator coupled to the touch-sensitive region; and

a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of modulation signals as a function

of a plurality of distinct digital codes, to initiate application of each of the plurality of modulation signals to the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the digital codes to discriminate electrical effects produced by the object upon at least one electrode, and to determine the position-based attribute of the object with respect to the plurality of electrodes using the electrical effects.

40. (Previously Presented) The device of claim 39 wherein the circuitry comprises an analog signal generator configured to generate a carrier signal and a modulator configured to amplitude modulate the carrier signal with each of the plurality of distinct digital codes to thereby produce the unique modulation signals.

41. (Original) The device of claim 39 wherein the touchsensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user.

42. (Original) The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the electrical effects.

43. (Original) The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the positions of the plurality of electrodes relative to each other.

44. (Previously Presented) The device of claim 39 wherein presence of the object to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes.

45. (Original) The device of claim 44 wherein the at least two of the plurality of electrodes comprise a first electrode having a first orientation and a second electrode having a second orientation substantially perpendicular to the first orientation.

46. (Original) The device of claim 39 further comprising a capacitor electrically coupled to at least some of the plurality of electrodes and to the demodulator.

47. (Original) The device of claim 46 wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes.

48. (Original) The device of claim 39 wherein the object is a finger.

49. (Original) The device of claim 39 wherein the object is a stylus.

50. (Previously Presented) The device of claim 39 wherein the electrodes are formed on a flexible substrate.

51. (Previously Presented) A device for detecting a position-based attribute of an object with respect to a touch-sensitive region comprising a plurality of electrodes, the device comprising:

means for applying a plurality of modulation signals to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the object, the plurality of modulation signals based on a plurality of distinct digital codes;

means for demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the object; and

means for determining the position-based attribute of the object with respect to the plurality of electrodes from the electrical effects.

REMARKS

We hereby respond to the non-final Office Action mailed on January 28, 2009 in the above-referenced matter. This is a Response filed under 37 C.F.R. § 1.111 within the shortened response period set by the Examiner. No new matter is added by this Response, and reconsideration of the rejections set forth in the Office Action is respectfully requested.

The Office Action requests clarification of the differences between our various claims and the teachings of United States Patent Publication No. 2005/0073324 ("Umeda"), which we submitted in an Information Disclosure Statement that accompanied our original application. The Office Action cites Umeda alone and in combination with several other references against our various claims. We respectfully traverse all of the prior art rejections contained in the Office Action, however, because the Umeda reference fails to describe certain features that are recited in each of our independent claims. Even if the Umeda reference were combined with the various other references cited in the Office Action, then, the resulting combinations would still fail to meet each and every feature of our claims.

Briefly, Umeda does not relate to any sort of method of system for detecting a position of an object. To the contrary, Umeda describes a fingerprint sensor that detects deflection of a membrane due to pressure applied by a fingerprint ridge.[1] That is, Umeda detects compression of an electrode resulting from an applied pressure, rather than any sort of position-based attribute such as the location of a finger with respect to a touchpad or other sensor. Indeed, because Umeda is entirely concerned with biometric fingerprint identification, the sensed quality is inherently position independent. Umeda therefore fails to detect any sort of position-based attribute of an object, as expressly described in our claims.

Each of our independent claims expressly recite "A method of detecting a position-based attribute of an object with respect to a touch-sensitive region comprising a plurality of electrodes" (claim 1), "a touch-sensitive device for detecting a position-based attribute of an object" (claim 39), or "a device for detecting a position-based attribute of an object with respect to a touch-sensitive region" (claim 51). These

[1] *See* Umeda, paragraph 0004.

methods and devices could be used, for example, to detect the position of a finger, stylus or other object with respect to a touchpad or other input device. The Umeda reference does not describe any such features, nor would Umeda be suitable for such functionality.

The Office Action cites to paragraph 0088 and to FIG. 1 of Umeda as describing our claim language that references "position based attributes". Paragraph 0088 is reproduced below in its entirety:

> [0088] A capacitance detector circuit of preferred embodiments of the present inventions is for use in a matrix capacitive sensor having a plurality of column lines and a row line intersecting the column lines and detects a change in capacitance at an intersection of a column line and a row line. The capacitance detector circuit includes a code generating unit for generating a code having orthogonality in time sequence to output the generated code as a column drive signal, a column line drive unit for concurrently driving a predetermined column lines which are selected in response to the code, a capacitance detecting unit, connected to the row line, for detecting a voltage by converting a total sum of changes in capacitance at intersections of the selected column lines into the voltage to output the detected voltage, and a decode processing unit for performing a predetermined calculation on a data string of the detected voltage output in time sequence on a per row line basis every cycle of the phase change of a PN code in a decode process to determine a voltage value responsive to the capacitance change at the intersection.

This language contains no reference to "position", much less "position based attributes". To the contrary, this language simply refers to detecting changes in capacitance at "an intersection", which is consistent with detecting the presence or absence of a fingerprint ridge. This language contains absolutely no description whatsoever of detecting a position-based attribute (such as the position of a finger, stylus or other object with respect to a plurality of electrodes) as recited in our claims.

Moreover, just as Umeda fails to disclose detection of a position-based attribute as recited in our claims the reference certainly cannot describe or suggest our claimed features relating to "discriminate[ing] electrical effects produced by the object" or determining the position-based attribute of the object with respect to the plurality of electrodes from the electrical effects, as recited in each of our independent claims.

The Office Action has not attempted to cite any particular portion of the Umeda reference against our claim language relating to discriminating electrical effects, but instead broadly applies twenty-six paragraphs and ten drawing figures of Umeda against large portions of our claim language. The first cited portion of Umeda,

paragraphs 131-144, describes a technique whereby the capacitance at each intersection of the fingerprint sensor is measured so that a map of the fingerprint can be created. The Office Action also cites Umeda's paragraphs 164-175, which describes a similar technique for relaying capacitance measurements from each of the fingerprint sensor intersections to the detection circuitry. Neither of these sections of Umeda, however, describes any technique or structure that "discriminate[s] electrical effects produced by the object" in any manner. Further, discriminating electrical effects produced by an object to determine a position-based attribute of an object with respect to a plurality of electrodes would be completely foreign to the Umeda fingerprint sensor, since it is not concerned with position-sensing in the manner recited in our claims.

We therefore respectfully request reconsideration of the prior art rejections contained in the Office Action because each of our claims recite features, such as "position-based attributes", "discriminat[ing] electrical effects produced by an object" and "determining the position-based attribute for the object with respect to the plurality of electrodes based upon the electrical effects", that are plainly not found within the cited Umeda reference. In the event that the rejection is maintained, we respectfully request that the Examiner provide an express reference to the particular portions of the reference that are alleged to describe these features.

The Office Action contains other shortcomings in addition to those discussed above. Our various dependent claims, for example, recite additional features that are not present in the art. Claims 2-5, for example, provide additional detail about the demodulating feature of claim 1, and claims 6-10 provide additional detail about the "position-based attributes" features referenced above. These additional features are well-beyond the teachings of Umeda. We also dispute that it would be obvious to incorporate the teachings of the other references (e.g., US Patent No. 5,880,411 ("Gillespie")) into Umeda, since Umeda does not relate to position sensing at all. In the event that the rejection is maintained, we reserve the right to further develop this point at a later date.

Moreover, we respectfully note that the Office Action cites paragraphs 112-125 of Umeda against our claims 21-22, which relate to complementary modulation signals. We have reviewed this portion of Umeda, and found no mention at all of complementary modulation signals. In the event that this rejection is maintained, we

respectfully request further clarification of the particular portion of Umeda that is alleged to describe the complementary modulation technique that is recited in the claim.

Claims 25-27 further recite various features relating to obtaining information about a second object in proximity to the touch-sensitive region. This feature is well-beyond the teachings of Umeda. The additional reference that is cited, US Patent No. 5,825,352 ("Bisset") does contain discussion of a technique for emulating mouse buttons that uses multiple fingers, but the reference does not teach the full extent of our claim language. In particular, the reference fails to describe any sort of processing of a resultant signal (i.e., a signal obtained from a plurality of applied modulation signals) to obtain information about the second object.

Regarding claim 37, which recites a guard signal applied to at least one inactive electrode, the Office Action again cites to a large portion (eighteen paragraphs and ten drawing figures) of Umeda. We have been unable to identify any language in this cited portion that relates at all to a guard signal; in the event that the rejection is maintained, we respectfully request clarification of the specific language of Umeda that is alleged to disclose this feature.

Again, however, these issues relating to the dependent claims are cumulative to the issues presented above, and are therefore unnecessary at this point in time. We nevertheless reserve the right to raise additional points at a later date, including in an appeal to the Board of Patent Appeals and Interferences, if necessary.

In view of the above remarks, it is respectfully submitted that the Examiner's rejections have been overcome. Accordingly, we respectfully submit that the application, as amended, is now in condition for allowance, and such allowance is therefore earnestly requested. Should the Examiner have any questions or wish to further discuss this application, we would welcome a telephone call to the undersigned at 480.385.5060.

No official fee is believed to be due in connection with this Response. If, however, any time extension or additional fee is required to consider this response or to otherwise prevent abandonment of this application, please consider this as a request for an extension of time and as authorization to charge Deposit Account No. 50-2091 for any fees that may be due.

Should the Examiner have any questions or suggestions that would place the Application in even better form, Applicant's counsel would welcome a telephone call at (480) 385-5060.

Respectfully submitted,

INGRASSIA, FISHER & LORENZ P.C.

Dated: April 27, 2009

By: /BRETT A. CARLSON/
Brett A. Carlson
Reg. No. 39,928
Telephone: (480) 385-5060
Customer No. 69819

Electronic Acknowledgement Receipt

EFS ID:	5220764
Application Number:	11274999
International Application Number:	
Confirmation Number:	7508
Title of Invention:	Methods and systems for detecting a position-based attribute of an object using digital codes
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Customer Number:	69819
Filer:	Brett Carlson/Missy Burbank
Filer Authorized By:	Brett Carlson
Attorney Docket Number:	028.0013
Receipt Date:	27-APR-2009
Filing Date:	15-NOV-2005
Time Stamp:	16:07:53
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20090427_Response.pdf	170345 8d2102fbeebbaa18789e089a11f56a46cf266b39	yes	13

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	8
	Applicant Arguments/Remarks Made in an Amendment	9	13
Warnings:			
Information:			
	Total Files Size (in bytes):	170345	

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☒ To be Mailed
11/274,999	11/15/2005	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY ☐ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 04/27/2009	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 51	Minus	** 51	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/NICHELE PETERSON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/274,999	11/15/2005	J. Kurth Reynolds	028.0013	7508

69819 7590 07/16/2009

INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

EXAMINER	
MCCOMMAS, STUART S	
ART UNIT	PAPER NUMBER
2629	

NOTIFICATION DATE	DELIVERY MODE
07/16/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@ifllaw.com

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

Office Action Summary	Application No.	Applicant(s)	
	11/274,999	REYNOLDS, J. KURTH	
	Examiner	Art Unit	
	Stuart McCommas	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-2, 4, 11-19, 21-22, 33-40, 46, 48, and 51 are rejected under 35 U.S.C. 102(e) as being anticipated by Umeda et al. (United States Patent Application Publication 2005/0073324), hereinafter referenced as Umeda.

Regarding claim 1, Umeda discloses a method of detecting a position-based attribute of an object with respect to a touch-sensitive region comprising a plurality of electrodes (paragraph 88; figure 1), the method comprising the steps of:

applying a plurality of modulation signals to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the object, the plurality of modulation signals based on a plurality of distinct digital codes (paragraphs 19-20; paragraphs 88-99; paragraphs 112-125; paragraphs 131-144; paragraphs 164-175; figures 1-10);

demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the object

(paragraphs 131-144; paragraphs 164-175; figures 1-10);

determining the position-based attribute of the object with respect to the plurality of electrodes from the electrical effects (paragraph 4; paragraph 88; paragraphs 19-20; paragraphs 131-144; figures 1-10).

Regarding claim 2, Umeda discloses everything as applied above, further Umeda discloses determining a peak value of the electrical effects (paragraphs 18-20; paragraphs 112-124; figures 1-10).

Regarding claim 4, Umeda discloses everything as applied above, further Umeda discloses wherein the determining step comprises determining a difference between the electrical effects associated with at least two electrodes (paragraphs 18-20; paragraphs 112-124; figures 1-10).

Regarding claim 11, Umeda discloses everything as applied above, further Umeda discloses wherein each of the plurality of distinct digital codes are substantially orthogonal to the remainder of the plurality of distinct digital codes (paragraphs 18-20; paragraphs 25-28; figures 1-10).

Regarding claim 12, Umeda discloses everything as applied above, further Umeda discloses wherein each of the plurality of distinct digital codes is a substantial portion of a code derived from a maximum length shift register sequence or M sequence (paragraphs 18-20; paragraphs 25-28; paragraphs 104-109; paragraphs 143-145; figures 1-10).

Regarding claim 13, Umeda discloses everything as applied above, further Umeda discloses wherein at least some of the plurality of distinct digital codes are selected to avoid the effects of noise in the resultant signal (paragraphs 18-

20; paragraphs 25-28; paragraphs 143-145; figures 1-10).

Regarding claim 14, Umeda discloses everything as applied above, further Umeda discloses generating each of the plurality of distinct digital codes (paragraphs 18-20; paragraphs 25-28; paragraphs 103-104; paragraphs 143-145; figures 1-10).

Regarding claim 15, Umeda discloses everything as applied above, further Umeda discloses producing the plurality of distinct digital codes using at least one shift register (paragraphs 25-28; paragraphs 103-109; paragraphs 143-145; figures 1-10).

Regarding claim 16, Umeda discloses everything as applied above, further Umeda discloses wherein the applying step comprises applying modulation signals substantially simultaneously to at least two of the plurality of electrodes (paragraphs 103-109; figures 1-10).

Regarding claim 17, Umeda discloses everything as applied above, further Umeda discloses wherein the demodulating step comprises receiving signals from at least two of the plurality of electrodes on a common signal path as the resultant signal (paragraphs 103-119; paragraphs 127-137; figures 1-10).

Regarding claim 18, Umeda discloses everything as applied above, further Umeda discloses wherein the electrical effects result from an electrical coupling between the object and at least some of the associated electrodes (paragraph 4-7; figures 1-10).

Regarding claim 19, Umeda discloses everything as applied above, further Umeda discloses wherein the electrical coupling is a capacitive coupling

(paragraphs 4-7; paragraph 13; figures 1-10).

Regarding claim 21, Umeda discloses everything as applied above, further Umeda discloses applying a plurality of each of the complementary modulation signals to the associated at least one of the plurality of electrodes to obtain a plurality of complementary sensed signals, the plurality of complementary modulation signals based on complements of the plurality of distinct digital codes (paragraphs 112-125; figures 1-10).

Regarding claim 22, Umeda discloses everything as applied above, further Umeda discloses demodulating each of the plurality of complementary sensed signals using the distinct digital code associated with the at least one of the plurality of electrodes to thereby identify complementary electrical effects from the plurality of electrodes, and comparing the electrical effects with the complementary electrical effects to thereby perform dual differential conversion (paragraphs 112-144; figures 1-10).

Regarding claim 33, Umeda discloses everything as applied above, further Umeda discloses wherein the distinct digital codes have more than two states depending on the digital code that is generated (paragraphs 25-28; paragraphs 103-109; paragraphs 143-145; figures 1-10).

Regarding claim 34, Umeda discloses everything as applied above, further Umeda discloses wherein the applying comprises amplitude modulating a carrier signal which is a DC carrier signal with each of the plurality of distinct digital codes (paragraphs 18-20; paragraphs 104-108; figures 1-10).

Regarding claim 35, Umeda discloses everything as applied above, further Umeda discloses wherein the plurality of electrodes comprises a first plurality of electrodes having a first orientation and a second plurality of electrodes having a second orientation (figures 1-4).

Regarding claim 36, Umeda discloses everything as applied above, further Umeda discloses wherein each of the plurality of modulation signals is applied to the first plurality of electrodes and received via the second plurality of electrodes (figures 1-4).

Regarding claim 37, Umeda discloses everything as applied above, further Umeda discloses applying a guard signal to at least one inactive electrode of the second plurality of electrodes (paragraphs 99-107; paragraphs 112-120; figures 1-10).

Regarding claim 38, Umeda discloses everything as applied above, further Umeda discloses wherein the applying step comprises applying a same one of the plurality of modulation signals to at least two of the plurality of electrodes (paragraphs 107-109; figures 1-10).

Regarding claim 39, Umeda discloses a touch-sensitive device for detecting a position-based attribute of an object (paragraph 88), the device comprising:

a touch-sensitive region comprising a plurality of electrodes having electrical characteristics configured to be affected by the proximity of the object (paragraph 88; figures 1-4);

circuitry associated with each of the electrodes (figures 1-4);

a demodulator (100) coupled to the touch-sensitive region (figures 1-4);

a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of modulation signals as a function of a plurality of distinct digital codes, to initiate application of each of the plurality of modulation signals to the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the digital codes to discriminate electrical effects produced by the object upon at least one electrode, and to determine the position-based attribute of the object with respect to the plurality of electrodes using the electrical effects (paragraphs 19-20; paragraphs 88-99; paragraphs 112-125; paragraphs 131-144; figures 1-10).

Regarding claim 40, Umeda discloses everything as applied above, further Umeda discloses wherein the circuitry comprises an analog signal generator configured to generate a carrier signal and a modulator configured to amplitude modulate the carrier signal with each of the plurality of distinct digital codes to thereby produce the unique modulation signals (paragraphs 18-20; paragraphs 104-108; figures 1-10).

Regarding claim 46, Umeda discloses everything as applied above, further Umeda discloses a capacitor electrically coupled to at least some of the plurality of electrodes and to the demodulator (figures 1-5).

Regarding claim 48, Umeda discloses everything as applied above, further Umeda wherein the object is a finger (figures 1-4).

Regarding claim 51, Umeda discloses a device for detecting a position-based attribute of an object with respect to a touch-sensitive region comprising a plurality of electrodes (figures 1-4), the device comprising:

means for applying a plurality of modulation signals to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the object, the plurality of modulation signals based on a plurality of distinct digital codes (paragraphs 19-20; paragraphs 88-99; paragraphs 112-125; paragraphs 131-144; paragraphs 165-175; figures 1-10);

means for demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the object (paragraphs 131-144; paragraphs 164-175; figures 1-10);

means for determining the position-based attribute of the object with respect to the plurality of electrodes from the electrical effects (paragraph 4; paragraph88; paragraphs 19-20; paragraphs 131-144; figures 1-10).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3, 5-8 and 49-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Gillespie et al. (United States Patent 5,880,411), hereinafter referenced as Gillespie.

Regarding claim 3, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the determining step comprises computing a centroid of the electrical effects.

In a similar field of invention Gillespie discloses wherein the determining step comprises computing a centroid of the electrical effects (column 13 lines 19-27).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the determining step comprises computing a centroid of the electrical effects for the purpose of precisely calculating the position of the finger on the touch sensitive area.

Regarding claim 5, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects.

In a similar field of invention Gillespie discloses wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects (column 22 lines 53-67; column 23 lines 1-34).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects for the purpose of precisely calculating the position of the finger on the touch sensitive area.

Regarding claim 6, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the position-based attribute corresponds to a position of the object with respect to the plurality of electrodes.

In a similar field of invention Gillespie discloses wherein the position-based attribute corresponds to a position of the object with respect to the plurality of electrodes (column 9 lines 3-35; figure 1).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the position-based attribute corresponds to a position of the object with respect to the plurality of electrodes for the purpose of precisely calculating the position of the finger on the touch sensitive area to perform calculations on the provided information.

Regarding claim 7, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the position-based attribute describes a motion of the object with respect to the plurality of electrodes.

In a similar field of invention Gillespie discloses wherein the position-based attribute describes a motion of the object with respect to the plurality of electrodes (column 44 lines 49-54; figure 1; figure 17D).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the position-based attribute describes a motion of the object with respect to the plurality of electrodes for the purpose of precisely determining the position of the finger and its activity on the touch sensitive area to perform calculations on the provided information.

Regarding claim 8, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the position-based attribute describes a change in position from a previous position.

In a similar field of invention Gillespie discloses wherein the position-based attribute describes a change in position from a previous position (column 27 lines 24-55; figure 1).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the position-based attribute describes a change in position from a previous position for the purpose of precisely determining the position of

the finger and its activity on the touch sensitive area to perform calculations on the provided information.

Regarding claim 49, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the object is a stylus.

In a similar field of invention Gillespie discloses wherein the object is a stylus (column 4 lines 42-46).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the object is a stylus for the purpose of allowing a user to utilize a stylus in a position based input system to input information including biometric information such as a signature.

Regarding claim 50, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the electrodes are formed on a flexible substrate.

In a similar field of invention Gillespie discloses wherein the electrodes are formed on a flexible substrate (column 9 lines 36-44).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Gillespie by specifically providing wherein the electrodes are formed on a flexible substrate for the purpose of allowing a user to use the sensor board in a flexible manner such as in a hand.

5. Claims 9, 28-29, and 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Benkley III (United States Patent Application Publication 2004/0081339), hereinafter referenced as Benkley.

Regarding claim 9, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the position-based attribute describes a velocity of the object.

In a similar field of invention Benkley discloses wherein the position-based attribute describes a velocity of the object (paragraph 21).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Benkley by specifically providing wherein the position-based attribute describes a velocity of the object for the purpose of precisely calculating the position of the finger on the touch sensitive area as it is moved across the touch sensitive area.

Regarding claim 28, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the determining step comprises defining an image of the object.

In a similar field of invention Benkley discloses wherein the determining step comprises defining an image of the object (paragraphs 53-54).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Benkley by specifically providing wherein the determining step comprises defining an image of the object

for the purpose of precisely calculating the position of the finger on the touch sensitive area as it is moved across the touch sensitive area (paragraphs 53-54).

Regarding claim 29, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the image represents a two-dimensional topography of the object projected upon the touch-sensitive region.

In a similar field of invention Benkley discloses wherein the image represents a two-dimensional topography of the object projected upon the touch-sensitive region (paragraphs 53-54).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Benkley by specifically providing wherein the image represents a two- dimensional topography of the object projected upon the touch-sensitive region for the purpose of precisely calculating the position of the finger on the touch sensitive area as it is moved across the touch sensitive area (paragraphs 53-54).

Regarding claim 44, Umeda discloses everything as applied above, however Umeda fails to disclose wherein presence of the object to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes.

In a similar field of invention Benkley discloses wherein presence of the object to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes (paragraphs 60-64; figures 2A-2B).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Benkley by specifically providing wherein presence of the object to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes for the purpose of precisely calculating the finger print for precise biometric identification (paragraphs 53-54).

Regarding claim 45, Umeda and Benkley, the combination discloses everything as applied above, further Umeda discloses wherein the at least two of the plurality of electrodes comprise a first electrode having a first orientation and a second electrode having a second orientation substantially perpendicular to the first orientation (figures 1-4).

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Zadesky et al. (United States Patent Application Publication 2003/0076306), hereinafter referenced as Zadesky.

Regarding claim 10, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the position-based attribute describes an acceleration of the object.

In a similar field of invention Zadesky discloses wherein the position-based attribute describes an acceleration of the object (paragraph 41).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Zadesky by specifically providing wherein the position-based attribute describes an acceleration of the object for the purpose of precisely identifying input from a user.

7. Claims 20 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Iwasaki et al. (United States Patent 6,621,487), hereinafter referenced as Iwasaki.

Regarding claim 20, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes.

In a similar field of invention Iwasaki discloses wherein the resultant signal is received as electrical effects obtained from an integrating capacitor Cs coupled to at least two of the plurality of electrodes (column 6 lines 54-67; column 7 lines 1-17; figures 1-2).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Iwasaki by specifically providing wherein the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes for the purpose of precisely identifying input from a user.

Regarding claim 47, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes.

In a similar field of invention Iwasaki discloses wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes (column 6 lines 54-67; column 7 lines 1-17; figures 1-2).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Iwasaki by specifically providing wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes for the purpose of precisely identifying input from a user.

8. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Ozluturk et al. (United States Patent 7,106,720), hereinafter referenced as Ozluturk.

Regarding claim 23, Umeda discloses everything as applied above, however Umeda fails to disclose adjusting at least one of the distinct digital codes in response to the resultant signals.

In a similar field of invention Ozluturk discloses adjusting at least one of the distinct digital codes in response to the resultant signals (column 5 lines 23-67; column 6 lines 1-12; figures 3-4).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Ozluturk by specifically providing adjusting at least one of the distinct digital codes in response to the resultant signals for the purpose of adjusting signals based on the channel conditions to improve the performance of receiving and demodulating signals to speed up the system (column 4 lines 24-34).

Regarding claim 24, Umeda discloses everything as applied above, however Umeda fails to disclose adjusting at least one of the modulation signals in response to the resultant sensed signals.

In a similar field of invention Ozluturk discloses adjusting at least one of the modulation signals in response to the resultant sensed signals when the code is adjusted (column 5 lines 23-67; column 6 lines 1-12; figures 3-4).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Ozluturk by specifically providing adjusting at least one of the modulation signals in response to the resultant sensed signals for the purpose of adjusting signals based on the channel conditions to improve the performance of receiving and demodulating signals to speed up the system (column 4 lines 24-34).

9. Claims 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Bisset et al. (United States Patent 5,825,352), hereinafter referenced as Bisset.

Regarding claim 25, Umeda discloses everything as applied above, however Umeda fails to disclose processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region.

In a similar field of invention Bisset discloses processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region (column 5 lines 6-60; figures 1-9).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Bisset by specifically providing processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region for the purpose of allowing multiple fingers to be used on a touch pad to input information quickly.

Regarding claim 26, Umeda and Bisset, the combination discloses everything as applied above, further Bisset discloses wherein the object and the second object

are separate parts of a human hand (column 5 lines 6-60; figures 1-9).

Regarding claim 27, Umeda and Bisset, the combination discloses everything as applied above, further Bisset discloses rejecting information relating to the second object when the second objects peak value is not above the threshold value necessary for a finger to be considered present (column 5 lines 6-60; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

10. Claims 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Benkley and further in view of Bisset.

Regarding claim 30, Umeda and Benkley, the combination discloses everything as applied above, however the combination fails to disclose processing the resultant signal to obtain information about a second object in proximity to the touch- sensitive region, the second object having a second image.

In a similar field of invention Bisset discloses processing the resultant signal to obtain information about a second object in proximity to the touch-sensitive region, the second object having a second image (column 5 lines 6-60; column 7 lines 1-34; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda and Benkley with Bisset by specifically processing the resultant signal to obtain information about a second object in proximity to the touch- sensitive region, the second object having a second image for the purpose of allowing multiple fingers to be used on a touch pad to input information quickly.

Regarding claim 31, Umeda, Benkley and Bisset, the combination discloses everything as applied above, further Bisset discloses tracking movements of the image and of the second image with respect to the touch-sensitive region (column 5 lines 6-60; column 7 lines 1-34; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

Regarding claim 32, Umeda, Benkley and Bisset, the combination discloses everything as applied above, further Bisset discloses determining whether the second image represents an undesired input, and if so, rejecting the second image if the peak input is below a threshold(column 5 lines 6-60; column 7 lines 1-34; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

11. Claims 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umeda in view of Yoshikawa et al. (United States Patent Application Publication 2003/0067449), hereinafter referenced as Yoshikawa.

Regarding claim 41, Umeda discloses everything as applied above, however Umeda fails to disclose wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user.

In a similar field of invention Yoshikawa discloses wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user (paragraph 8; paragraphs 83-90; figures 1-2).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Umeda with Yoshikawa by specifically providing wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user for the purpose of providing feedback to a user to let the use know that input is being received (paragraphs 6-7; paragraph 25).

Regarding claim 42, Umeda and Yoshikawa, the combination discloses everything as applied above, further Yoshikawa discloses wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the electrical effects (paragraphs 24-33; paragraphs 81-90; figures 1-8).

Regarding claim 43, Umeda and Yoshikawa, the combination discloses everything as applied above, further Yoshikawa discloses wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the positions of the plurality of electrodes relative to each other (paragraphs 24-33; paragraphs 81-90; figures 1-8).

Response to Arguments

12. Applicant's arguments have been fully considered but they are not persuasive.

On pages 9-11 of Applicant's remarks, Applicant argues that Umeda does not disclose detection of a position based attribute and discriminating electrical effects produced by the object.

The Examiner respectfully disagrees, because Umeda discloses using a capacitive touch pad to detect the position of ridges and irregularities on an individual's finger (paragraph 92). The Examiner is construing this as clearly falling under the claimed "position based attribute". Simply because Umeda is concerned with fingerprinting does not mean that the system of Umeda is not used to detect a position based attribute (i.e. the position of ridges and irregularities of the finger), and in fact this limitation is clearly disclosed in the reference. Further Umeda clearly discloses discriminating the electrical effects produced by the finger in paragraphs 131-144 to determine position based attributes of the finger. This process is clearly outlined in the previously cited portions, and Applicant has not stated how Umeda fails to disclose these features beyond simply claiming that Umeda does not disclose them.

On pages 11-12 of Applicant's remarks, Applicant argues that Umeda does not disclose complementary modulation signals and a guard signal, and that Bisset does not disclose processing of a resultant signal.

The Examiner respectfully disagrees, because Umeda discloses complementary modulation signals in paragraphs 113-115, where a modulated bit pulse stream that is complementary is used to control the device. Further Umeda discloses a guard signal in paragraphs 112-115, and the Applicant has not shown how Umeda fails to disclose this guard signal. Bisset discloses processing of a resultant signal in column 5 lines 6-60, and the Applicant has failed to show how Bisset does not disclose this feature.

Conclusion

13. **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stuart McCommas whose telephone number is (571)270-3568. The examiner can normally be reached on Monday-Friday 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on (571)272-7687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Stuart McCommas
Patent Examiner
Art Unit 2629

SSM

/Alexander Eisen/

Supervisory Patent Examiner, Art Unit 2629

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Stuart McCommas	2629

SEARCHED			
Class	Subclass	Date	Examiner
345	173	1/15/2009	SSM

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Search Attached	1/15/2009	SSM
EAST Search Updated	7/10/2009	SSM

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	"20050073324" and position	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/07/10 17:11
S1	19	US-4170025-$.DID. OR US-4459541-$.DID. OR US-5305017-$.DID. OR US-5666113-$.DID. OR US-5790106-$.DID. OR US-5825352-$.DID. OR US-5861875-$.DID. OR US-5917906-$.DID. OR US-6570557-$.DID. OR US-6704005-$.DID. OR US-6771280-$.DID. OR US-6788288-$.DID. OR US-20030030628-$.DID. OR US-20030035570-$.DID. OR US-20040081339-$.DID. OR US-20050005703-$.DID. OR US-20050024065-$.DID. OR US-20050052425-$.DID. OR US-20050073324-$.DID.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:04
S2	2	US-20020049070-$.DID. OR US-20050122785-$.DID.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:05
S3	1289	345/173.ccls. and capacitive	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:16
S4	1	"5880411".pn.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:18
S5	18	345/173.ccls. and capacitive and spread spectrum	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:21
S6	1	345/173.ccls. and capacitive and change code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:30

S7	35	345/173.ccls. and capacitive and digital code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:32
S8	1	345/173.ccls. and capacitive and digital code and modulation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:32
S9	1	345/173.ccls. and capacitive and digital code and modulate	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:32
S10	35	345/173.ccls. and capacitive and digital code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:32
S11	70	345/173.ccls. and capacitive and modulate	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:33
S12	17	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/01/12 16:40
S13	3	S12 and centroid	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:40
S14	2	S12 and baseline	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:42
S15	6	S12 and change with position	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:43
S16	0	S12 and velocity with position	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:44
S17	4	S12 and velocity	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:44

S18	6	S12 and change with position	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:45
S19	12	S12 and speed	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:45
S20	1	S12 and acceleration	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:55
S21	0	345/173.ccls. and capacitivie and acceleration	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:56
S22	195	345/173.ccls. and capacitive and acceleration	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:56
S23	6	345/173.ccls. and capacitive and (acceleration with detect)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:56
S24	71	345/173.ccls. and capacitive and (acceleration with finger)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:59
S25	0	"20050073324" and orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:00
S26	2	"20050073324"	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:01
S27	0	"20050073324" and ortho	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:31
S28	0	"20050073324" and orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:32
S29	693	345/173.ccls. and orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:32
S30	324	345/173.ccls. and orthogonal and capacitive	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:32
S31	9	345/173.ccls. and orthogonal with code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:32
S32	0	"20050073324" and correlation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:34

S33	2	"20050073324" and cross	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:35
S34	2	"20050073324" and noise	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:38
S35	0	"20050073324" and integrating	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:42
S36	2	S12 and integrating	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:42
S37	0	S12 and integrating capacitor	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:42
S38	31	345/173.ccls. and integrating capacitor	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:43
S39	19	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$ or US-20030076306-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$ or US-6621487-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/01/13 12:06
S40	6	S39 and code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:06
S41	1339	345/173.ccls. and code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:13
S42	112	345/173.ccls. and code with (sensed or detected or adjust)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:13

S43	8	("3819857" | "4126760" | "5210380" | "5416280").PN. OR ("5952999").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:16
S44	0	code generation with channel conditions	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:20
S45	0	code generation with channel]	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:20
S46	275	code generation with channel	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:20
S47	0	"345.173,ccks", and code generation with channel	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:34
S48	0	"345.173,ccks", and code generation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:34
S49	0	"345.173,ccls." and code generation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:34
S50	6	345/173.ccls. and code generation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:35
S51	0	(11/274999).APP.	USPAT; USOCR	ADJ	ON	2009/01/13 12:36
S52	0	adjust code with reciever	USPAT; USOCR	ADJ	ON	2009/01/13 12:37
S53	0	adjusting code with reciever	USPAT; USOCR	ADJ	ON	2009/01/13 12:37
S54	1974	walsh code	USPAT; USOCR	ADJ	ON	2009/01/13 12:37
S55	17	walsh code with adjust	USPAT; USOCR	ADJ	ON	2009/01/13 12:37
S56	4005	code with adjust	USPAT; USOCR	ADJ	ON	2009/01/13 12:40
S57	33802	code with change	USPAT; USOCR	ADJ	ON	2009/01/13 12:40
S58	65426	(adjust or change) with code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:43
S59	112	"345".clss. and (adjust or change) with code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:44

S60	23	("20010006006" | "20030066692" | "20030164820" | "20030217873" | "4317227" | "5059959" | "5194852" | "5404458" | "5412189" | "5628031" | "5638093" | "5691959" | "5717432" | "5856820" | "5986224" | "6161434" | "6167165" | "6404353" | "6549193" | "6555235" | "6724373" | "6738051" | "6891527").PN. OR ("7345677").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:35
S61	1409	(update with code) and cdma	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:37
S62	134	(update code) and cdma	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:37
S63	24	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$ or US-20030076306-$ or US-20020008692-$ or US-20040136445-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$ or US-6621487-$ or US-3605019-$ or US-5204876-$ or US-7106720-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/01/13 14:44
S64	16	S63 and hand and finger	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:44

S65	1	S63 and hand and finger and reject	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:46
S66	2	S63 and fingerprint and image	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:49
S67	24	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$ or US-20030076306-$ or US-20020008692-$ or US-20040136445-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$ or US-6621487-$ or US-3605019-$ or US-5204876-$ or US-7106720-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/01/13 15:01
S68	0	S67 and amplitude modulating	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:01
S69	2	S67 and amplitude modulation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:01
S70	0	S67 and guard signal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:02
S71	1	S67 and ground signal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:06
S72	13	S67 and ground	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:06
S73	1	S67 and (ground with row)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:10

S74	1	S67 and tactile feedback	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:14
S75	265	345/173.ccls. and tactile feedback	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:14
S76	152	345/173.ccls. and tactile feedback and capacitive	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:14
S77	14	S67 and (stylus or pen)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:19
S78	9	S67 and (flexible or bend)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:20

7/10/2009 5:35:01 PM
C:\Documents and Settings\smccommas\My Documents\EAST\Workspaces\11274999touchsensor.wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Stuart McCommas	2629

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/15/2009	07/10/2009							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
	7	✓	✓							
	8	✓	✓							
	9	✓	✓							
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	11	✓	✓							
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	15	✓	✓							
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	29	✓	✓							
	30	✓	✓							
	31	✓	✓							
	32	✓	✓							
	33	✓	✓							
	34	✓	✓							
	35	✓	✓							
	36	✓	✓							

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Stuart McCommas	2629

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/15/2009	07/10/2009							
	37	✓	✓							
	38	✓	✓							
	39	✓	✓							
	40	✓	✓							
	41	✓	✓							
	42	✓	✓							
	43	✓	✓							
	44	✓	✓							
	45	✓	✓							
	46	✓	✓							
	47	✓	✓							
	48	✓	✓							
	49	✓	✓							
	50	✓	✓							
	51	✓	✓							

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	11274999	Filing Date	2005-11-15	Docket Number (if applicable)	028.0013	Art Unit	2629
First Named Inventor	J. Kurth Reynolds			Examiner Name	Stuart McCommas		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 502091

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Signature of Registered U.S. Patent Practitioner			
Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2009-10-16
Name	Brett A. Carlson	Registration Number	39928

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

UTILITY PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	J. Kurth REYNOLDS	Confirmation No.: 7508
Appl. No.	:	11/274,999	
Filed	:	November 15, 2005	
Art Unit	:	2629	
Examiner	:	Stuart McCommas	
Docket No.	:	028.0013	
Title	:	METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES	

REQUEST FOR CONTINUED EXAMINATION
FILED UNDER 37 C.F.R. § 1.114

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

**FILED ELECTRONICALLY USING THE EFS-WEB SYSTEM

Commissioner:

In response to the Final Office Action mailed July 16, 2009, please continue to examine this application by entering the following amendments, and considering the remarks that follow.

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 11 of this paper.

 Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

Amendments to the Claims

Please amend the claims without prejudice or disclaimer to read as follows

1. (Currently Amended) A method of detecting a ~~position-based attribute of an object~~ position of a pointer with respect to a touch-sensitive region comprising a plurality of electrodes, the method comprising the steps of:

applying a plurality of modulation signals to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the ~~object~~ pointer, the plurality of modulation signals based on a plurality of distinct digital codes;

demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the ~~object~~ pointer; and

determining the ~~position-based attribute of the object~~ position of the pointer with respect to the plurality of electrodes from the electrical effects.

2. (Currently Amended) The method of claim 1 wherein the determining step comprises determining the position of the pointer with respect to the plurality of electrodes based upon a peak value of the electrical effects.

3. (Currently Amended) The method of claim 1 wherein the determining step comprises determining the position of the pointer with respect to the plurality of electrodes based upon ~~computing a~~ a computed centroid of the electrical effects.

4. (Previously Presented) The method of claim 1 wherein the determining step comprises determining a difference between the electrical effects associated with at least two electrodes.

5. (Original) The method of claim 1 wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects.

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6. (Currently Amended) The method of claim 1 wherein the ~~position-based attribute corresponds to a position of the object with respect to the plurality of electrodes~~ determining comprises determining the position of the pointer as the pointer moves with respect to the touch sensitive region.

7. (Currently Amended) The method of claim 1 ~~wherein the position-based attribute~~ further comprising providing an output based upon the position that describes a motion of the ~~object~~ pointer with respect to the plurality of electrodes.

8. (Previously Presented) The method of claim 1 ~~wherein the position-based attribute~~ further comprising providing an output based upon the position that describes a change in the position from a previous position.

9. (Currently Amended) The method of claim 1 ~~wherein the position-based attribute~~ further comprising providing an output based upon the position that describes a velocity of the ~~object~~ pointer.

10. (Currently Amended) The method of claim 1 ~~wherein the position-based attribute~~ further comprising providing an output based upon the position that describes an acceleration of the ~~object~~ pointer.

11. (Previously Presented) The method of claim 1 wherein each of the plurality of distinct digital codes is substantially orthogonal to the remainder of the plurality of distinct digital codes.

12. (Previously Presented) The method of claim 1 wherein each of the plurality of distinct digital codes is a substantial portion of a code derived from a maximum length shift register sequence.

13. (Previously Presented) The method of claim 1 wherein at least some of the plurality of distinct digital codes are selected to avoid the effects of noise in the resultant signal.

14. (Original) The method of claim 1 further comprising the step of generating each of the plurality of distinct digital codes.

15. (Original) The method of claim 14 wherein the generating step comprises producing the plurality of distinct digital codes using at least one shift register.

16. (Previously Presented) The method of claim 1 wherein the applying step comprises applying modulation signals substantially simultaneously to at least two of the plurality of electrodes.

17. (Previously Presented) The method of claim 1 wherein the demodulating step comprises receiving signals from at least two of the plurality of electrodes on a common signal path as the resultant signal.

18. (Currently Amended) The method of claim 1 wherein the electrical effects result from an electrical coupling between the ~~object~~ pointer and at least some of the associated electrodes.

19. (Original) The method of claim 18 wherein the electrical coupling is a capacitive coupling.

20. (Previously Presented) The method of claim 18 wherein the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes.

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21. (Previously Presented) The method of claim 1 further comprising the steps of:

applying a plurality of complementary modulation signals to the associated at least one of the plurality of electrodes to obtain a plurality of complementary sensed signals, the plurality of complementary modulation signals based on complements of the plurality of distinct digital codes.

22. (Original) The method of claim 21 further comprising the steps of:

demodulating each of the plurality of complementary sensed signals using the distinct digital code associated with the at least one of the plurality of electrodes to thereby identify complementary electrical effects from the plurality of electrodes; and

comparing the electrical effects with the complementary electrical effects to thereby perform dual differential conversion.

23. (Previously Presented) The method of claim 1 further comprising the step of adjusting at least one of the distinct digital codes in response to the resultant signals.

24. (Previously Presented) The method of claim 1 further comprising the step of adjusting at least one of the modulation signals in response to the resultant signal.

25. (Currently Amended) The method of claim 1 further comprising the step of processing the resultant signal to ~~obtain information about~~ determine a second position of a second ~~object~~ pointer in proximity to the touch-sensitive region that is independent of the pointer.

26. (Currently Amended) The method of claim 25 wherein the ~~object~~ pointer and the second ~~object~~ pointer are separate parts of a human hand.

27. (Currently Amended) The method of claim 25 further comprising the step of rejecting information relating to the second ~~object~~ pointer.

28. (Currently Amended) The method of claim 1 wherein the determining step comprises defining an image of the ~~object~~ pointer.

29. (Currently Amended) The method of claim 28 wherein the image represents a two-dimensional topography of the ~~object~~ pointer projected upon the touch-sensitive region.

30. (Currently Amended) The method of claim 28 further comprising the step of processing the resultant signal to ~~obtain information about~~ determine a position of a second ~~object~~ pointer in proximity to the touch-sensitive region, the second ~~object~~ pointer being independent of the pointer and having a second image.

31. (Currently Amended) The method of claim 30 further comprising the step of tracking movements of the ~~object~~ pointer and of the second ~~object~~ pointer with respect to the touch-sensitive region.

32. (Currently Amended) The method of claim 30 further comprising the step of determining whether the second ~~object~~ pointer represents an undesired input, and if so, rejecting the second ~~object~~ pointer.

33. (Original) The method of claim 1 wherein the distinct digital codes have more than two states.

34. (Previously Presented) The method of claim 1 wherein the applying step comprises amplitude modulating a carrier signal with each of the plurality of distinct digital codes.

35. (Original) The method of claim 1 wherein the plurality of electrodes comprises a first plurality of electrodes having a first orientation and a second plurality of electrodes having a second orientation.

36. (Previously Presented) The method of claim 35 wherein each of the plurality of modulation signals is applied to the first plurality of electrodes and received via the second plurality of electrodes.

37. (Original) The method of claim 35 further comprising the step of applying a guard signal to at least one inactive electrode of the second plurality of electrodes.

38. (Previously Presented) The method of claim 1 wherein the applying step comprises applying a same one of the plurality of modulation signals to at least two of the plurality of electrodes.

39. (Currently Amended) A touch-sensitive device for detecting a ~~position-based attribute of an object~~ position of a pointer, the device comprising:

a touch-sensitive region comprising a plurality of electrodes having electrical characteristics configured to be affected by the proximity of the ~~object~~ pointer;

circuitry associated with each of the electrodes;

a demodulator coupled to the touch-sensitive region; and

a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of modulation signals as a function of a plurality of distinct digital codes, to initiate application of each of the plurality of modulation signals to the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the digital codes to discriminate electrical effects produced by the ~~object~~ pointer upon at least one electrode, and to determine the ~~position-based attribute of the object~~ position of the pointer with respect to the plurality of electrodes using the electrical effects.

40. (Previously Presented) The device of claim 39 wherein the circuitry comprises an analog signal generator configured to generate a carrier signal and a modulator configured to amplitude modulate the carrier signal with each of the plurality of distinct digital codes to thereby produce the unique modulation signals.

41. (Original) The device of claim 39 wherein the touch sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user.

42. (Original) The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the electrical effects.

43. (Original) The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the positions of the plurality of electrodes relative to each other.

44. (Currently Amended) The device of claim 39 wherein presence of the ~~object~~ pointer to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes.

45. (Original) The device of claim 44 wherein the at least two of the plurality of electrodes comprise a first electrode having a first orientation and a second electrode having a second orientation substantially perpendicular to the first orientation.

46. (Original) The device of claim 39 further comprising a capacitor electrically coupled to at least some of the plurality of electrodes and to the demodulator.

47. (Original) The device of claim 46 wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes.

48. (Currently Amended) The device of claim 39 wherein the ~~object~~ pointer is a finger.

49. (Currently Amended) The device of claim 39 wherein the ~~object~~ pointer is a stylus.

50. (Previously Presented) The device of claim 39 wherein the electrodes are formed on a flexible substrate.

51. (Currently Amended) A device for detecting a ~~position-based attribute of an object~~ position of a pointer with respect to a touch-sensitive region comprising a plurality of electrodes, the device comprising:

means for applying a plurality of modulation signals to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the ~~object~~ pointer, the plurality of modulation signals based on a plurality of distinct digital codes;

means for demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the ~~object~~ pointer; and

means for determining the ~~position-based attribute of the object~~ position of the pointer with respect to the plurality of electrodes from the electrical effects.

52 (New). The device of claim 51 wherein the means for determining is configured to determine the position of the pointer as the pointer moves with respect to the touch sensitive region.

53 (New). The device of claim 51 wherein the resultant signal is directly affected by the position of the pointer.

54 (New). The device of claim 51 wherein the pointer is a finger.

55 (New). The device of claim 51 wherein the pointer is a stylus.

56 (New). The device of claim 51 wherein the electrodes are substantially rigidly fixed in position with respect to each other.

57 (New). The device of claim 51 wherein the determining means is further configured to determine a second position of an independent second pointer that is in proximity

to the touch-sensitive region, wherein the second position is determined from the electrical effects.

58 (New). The method of claim 1 wherein the resultant signal is directly affected by the position of the pointer.

59 (New). The method of claim 1 wherein the pointer is a finger.

60 (New). The method of claim 1 wherein the pointer is a stylus.

61 (New). The method of claim 1 wherein the electrodes are substantially rigidly fixed in position with respect to each other.

62 (New). The device of claim 39 wherein the electrodes are substantially rigidly fixed in position with respect to each other.

63 (New). The device of claim 39 wherein the resultant signal is directly affected by the position of the pointer.

64 (New). The device of claim 39 wherein the processor is further configured to determine a second position of an independent second pointer that is in proximity to the touch-sensitive region, wherein the second position is determined from the electrical effects.

65 (New). The device of claim 39 wherein the processor is further configured to determine the position of the pointer as the pointer moves with respect to the touch sensitive region.

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REMARKS

This is a Response filed under 37 C.F.R. § 1.114 within the shortened response period set by the Examiner. In response to the Final Office Action mailed on July 16, 2009, please continue to examine the application to consider the above amendments and the following remarks. No new matter is added by this Response, and reconsideration of the rejections set forth in the Office Action is respectfully requested.

We greatly appreciate the courtesy extended by Examiner McCommas in the telephonic interview on October 13, 2009. During that interview, we discussed the Umeda reference cited in the Final Office Action, as well as several differences between the art and our claims. We are grateful for the Examiner's suggestions to obtain allowance over the Umeda reference, and we have incorporated these suggestions into this response.

Claim 1, for example, recites "*determining the position of the pointer with respect to the plurality of electrodes from the electrical effects*". Claim 39 recites a processor configured "*to determine the position of the pointer with respect to the plurality of electrodes",* and claim 51 recites *"means for determining the position of the pointer with respect to the plurality of electrodes".* As we discussed during the interview, Umeda does not describe at least this feature.

As we noted in our prior response, Umeda describes a fingerprint sensor that detects deflection of a membrane due to pressure applied by a fingerprint ridge.[1] That is, Umeda detects compression of a deformable electrode resulting from an applied pressure. The reference does not contemplate any techniques or structures that could be used in determining the position of a pointer (e.g., a finger or a stylus). Because each of our independent claims recites determining the position of a pointer with respect to a plurality of electrodes, the Umeda reference falls short of teaching the full extent of our claim language.

The various dependent claims recite additional features that even further distinguish Umeda and the other art of record. Claims 6, 52 and 65, for example, recite determining the position of the pointer as the pointer moves with respect to the touch sensitive region. Claims 25, 57 and 64 recite determining a position of a second pointer

[1] *See* Umeda, paragraph 0004.

that is independent from the first pointer. Claims 56, 61 and 62 recite that the electrodes are substantially rigidly fixed with respect to each other. Each of these features is well beyond the teachings of Umeda or any combination of Umeda with the other references of record.

The other dependent claims similarly recite many different additional features that distinguish over the art of record. These features are cumulative to the issues presented above, and a detailed analysis of these features is not needed at this point in time. We nevertheless reserve the right to raise additional points at a later date, including in an appeal to the Board of Patent Appeals and Interferences, if necessary.

In view of the above remarks, it is respectfully submitted that the rejections set forth in the Final Office Action have been overcome. Accordingly, we respectfully request reconsideration, and we submit that the application, as amended, is now in condition for allowance.

Should the Examiner have any questions or wish to further discuss this application, we would welcome a telephone call to the undersigned at 480.385.5069.

No official fee is believed to be due in connection with this Response. If, however, any time extension or additional fee is required to consider this response or to otherwise prevent abandonment of this application, please consider this as a request for an extension of time and as authorization to charge Deposit Account No. 50-2091 for any fees that may be due.

Should the Examiner have any questions or suggestions that would place the Application in even better form, Applicant's counsel would welcome a telephone call at (480) 385-5060.

Respectfully submitted,

INGRASSIA, FISHER & LORENZ P.C.

Dated: October 16, 2009

By: /BRETT A. CARLSON/
Brett A. Carlson
Reg. No. 39,928
Telephone: (480) 385-5060
Customer No. 69819

Electronic Patent Application Fee Transmittal

Application Number:	11274999
Filing Date:	15-Nov-2005
Title of Invention:	Methods and systems for detecting a position-based attribute of an object using digital codes
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Filer:	Brett Carlson/Sharron Castillo
Attorney Docket Number:	028.0013

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Independent claims in excess of 3	1201	14	220	3080
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	810	810
		Total in USD ($)		**3890**

Electronic Acknowledgement Receipt

EFS ID:	6277396
Application Number:	11274999
International Application Number:	
Confirmation Number:	7508
Title of Invention:	Methods and systems for detecting a position-based attribute of an object using digital codes
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Customer Number:	69819
Filer:	Brett Carlson/Sharron Castillo
Filer Authorized By:	Brett Carlson
Attorney Docket Number:	028.0013
Receipt Date:	16-OCT-2009
Filing Date:	15-NOV-2005
Time Stamp:	16:48:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$3890
RAM confirmation Number	2830
Deposit Account	502091
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	20091016_RCE.pdf	768322 f3b3b467b2b91975a96a0d7cc0e8d44de4630959	no	3
Warnings:					
Information:					
2		20091016_RCEAmendment.pdf	156173 a66cc2bee28cb65e8fa1f1e586ded3a08bce45d5	yes	12

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment Submitted/Entered with Filing of CPA/RCE	1	1
Claims	2	10
Applicant Arguments/Remarks Made in an Amendment	11	12

Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	32012 a3a0f68b8e0b7448bf89c04fa40dd743813cd5fa	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	956507		

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/274,999	Filing Date 11/15/2005	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	10/16/2009	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 65	Minus	** 51	= 14	X $ =		OR	X $52=	728
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	**728**

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/LASHAWN MARKS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/274,999	11/15/2005	J. Kurth Reynolds	028.0013	7508

69819 7590 10/20/2009

INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

EXAMINER	
MCCOMMAS, STUART S	
ART UNIT	PAPER NUMBER
2629	

NOTIFICATION DATE	DELIVERY MODE
10/20/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@ifllaw.com

Interview Summary	Application No.	Applicant(s)	
	11/274,999	REYNOLDS, J. KURTH	
	Examiner	Art Unit	
	Stuart McCommas	2629	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Stuart McCommas*. (3)_____.

(2) *Brett Carlson*. (4)_____.

Date of Interview: *13 October 2009*.

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☒ No.
If Yes, brief description: _____.

Claim(s) discussed: *1 and 25*.

Identification of prior art discussed: *Umeda, bisset*.

Agreement with respect to the claims f)☐ was reached. g)☐ was not reached. h)☒ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *Applicant's representative and the inventor further explained the differences in the invention with the prior art. Applicant's representative suggested possible claim amendment language, and the Examiner also provided some claim amendment suggestions based on the discussion*.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

	/Stuart McCommas, Patent Examiner, Art Unit 2629/

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

———

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

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INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

EXAMINER	
MCCOMMAS, STUART S	
ART UNIT	PAPER NUMBER
2629	

NOTIFICATION DATE	DELIVERY MODE
01/05/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@ifllaw.com

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

Office Action Summary	Application No.	Applicant(s)	
	11/274,999	REYNOLDS, J. KURTH	
	Examiner	Art Unit	
	Stuart McCommas	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 October 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-65* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-65* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/16/2009 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3-8, 11-19, 21-22, 33-40, 46, and 48-56, 58-63 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie et al. (United States Patent 5,880,411), hereinafter referenced as Gillespie, in view of Umeda et al. (United States Patent Application Publication 2005/0073324), hereinafter referenced as Umeda.

Regarding claim 1, Gillespie discloses a method of detecting a position of a pointer with respect to a touch-sensitive region comprising a plurality of electrodes (figures 1-5), the method comprising the steps of:

applying a plurality of modulation signals to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the

position of the pointer (column 4 lines 45-67; column 5 lines 1-11; column 6 lines 15-45; column 11 lines 65-67; column 12 lines 1-63; figures 1-5);

interpreting the resultant signal to thereby discriminate electrical effects produced by the pointer (column 6 lines 15-45; column 13 lines 35-61; column 14 lines 40-65; figures 1-5);

determining the position of the pointer with respect to the plurality of electrodes from the electrical effects (column 6 lines 15-45; column 14 lines 40-65; figures 1-5).

However Gillespie fails to disclose that the plurality of modulation signals are based on a plurality of distinct digital codes, and demodulating the resultant signal using the plurality of distinct digital codes.

In a similar field of invention Umeda discloses using a plurality of modulation signals based on a plurality of distinct digital codes (paragraphs 19-20; paragraphs 88-99; paragraphs 112-125; paragraphs 131-144; paragraphs 164-175; figures 1-1), and demodulating the resultant signal using the plurality of distinct digital codes (paragraphs 131-144; paragraphs 164-175; figures 1-10).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie with Umeda by specifically providing that the plurality of modulation signals are based on a plurality of distinct digital codes, and demodulating the resultant signal using the plurality of distinct digital codes for the purpose of precisely calculating the position of the finger on the touch sensitive area.

Regarding claim 3, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses determining the position of the pointer with respect to the plurality of electrodes based upon a computed centroid of the electrical effects (column 13 lines 19-27; figures 1-5).

Regarding claim 4, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the determining step comprises determining a difference between the electrical effects associated with at least two electrodes (paragraphs 18-20; paragraphs 112-124; figures 1-10).

Regarding claim 5, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects (column 22 lines 53-67; column 23 lines 1-34).

Regarding claim 6, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the position-based attribute corresponds to a position of the object with respect to the plurality of electrodes (column 9 lines 3-35; figure 1).

Regarding claim 7, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the position-based attribute describes a motion of the object with respect to the plurality of electrodes (column 44 lines 49-54; figure 1; figure 17D).

Regarding claim 8, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the position-based attribute

describes a change in position from a previous position (column 27 lines 24-55; figure 1).

Regarding claim 11, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein each of the plurality of distinct digital codes are substantially orthogonal to the remainder of the plurality of distinct digital codes (paragraphs 18-20; paragraphs 25-28; figures 1-10).

Regarding claim 12, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein each of the plurality of distinct digital codes is a substantial portion of a code derived from a maximum length shift register sequence or M sequence (paragraphs 18-20; paragraphs 25-28; paragraphs 104-109; paragraphs 143-145; figures 1-10).

Regarding claim 13, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein at least some of the plurality of distinct digital codes are selected to avoid the effects of noise in the resultant signal (paragraphs 18-20; paragraphs 25-28; paragraphs 143-145; figures 1-10).

Regarding claim 14, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses generating each of the plurality of distinct digital codes (paragraphs 18-20; paragraphs 25-28; paragraphs 103-104; paragraphs 143-145; figures 1-10).

Regarding claim 15, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses producing the plurality of distinct digital codes using at least one shift register (paragraphs 25-28; paragraphs 103-109;

paragraphs 143-145; figures 1-10).

Regarding claim 16, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the applying step comprises applying modulation signals substantially simultaneously to at least two of the plurality of electrodes (paragraphs 103-109; figures 1-10).

Regarding claim 17, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the demodulating step comprises receiving signals from at least two of the plurality of electrodes on a common signal path as the resultant signal (paragraphs 103-119; paragraphs 127-137; figures 1-10).

Regarding claim 18, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses the pointer (figure 1) and Umeda discloses wherein the electrical effects result from an electrical coupling between the object and at least some of the associated electrodes (paragraph 4-7; figures 1-10).

Regarding claim 19, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the electrical coupling is a capacitive coupling (paragraphs 4-7; paragraph 13; figures 1-10).

Regarding claim 21, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses applying a plurality of each of the complementary modulation signals to the associated at least one of the plurality of electrodes to obtain a plurality of complementary sensed signals, the plurality of complementary modulation signals based on complements of the plurality of distinct digital codes (paragraphs 112-125; figures 1-10).

Regarding claim 22, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses demodulating each of the plurality of complementary sensed signals using the distinct digital code associated with the at least one of the plurality of electrodes to thereby identify complementary electrical effects from the plurality of electrodes, and comparing the electrical effects with the complementary electrical effects to thereby perform dual differential conversion (paragraphs 112-144; figures 1-10).

Regarding claim 33, Gillespie and Umeda, the combiantion discloses everything as applied above, further Umeda discloses wherein the distinct digital codes have more than two states depending on the digital code that is generated (paragraphs 25-28; paragraphs 103-109; paragraphs 143-145; figures 1-10).

Regarding claim 34, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the applying comprises amplitude modulating a carrier signal which is a DC carrier signal with each of the plurality of distinct digital codes (paragraphs 18-20; paragraphs 104-108; figures 1-10).

Regarding claim 35, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the plurality of electrodes comprises a first plurality of electrodes having a first orientation and a second plurality of electrodes having a second orientation (figures 1-4).

Regarding claim 36, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein each of the plurality of modulation

signals is applied to the first plurality of electrodes and received via the second plurality of electrodes (figures 1-4).

Regarding claim 37, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses applying a guard signal to at least one inactive electrode of the second plurality of electrodes (paragraphs 99-107; paragraphs 112-120; figures 1-10).

Regarding claim 38, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the applying step comprises applying a same one of the plurality of modulation signals to at least two of the plurality of electrodes (paragraphs 107-109; figures 1-10).

Regarding claim 39, Gillespie discloses a touch-sensitive device for detecting a position of a pointer (figure 1), the device comprising:

a touch-sensitive region comprising a plurality of electrodes having electrical characteristics configured to be affected by the proximity of the pointer (column 4 lines 45-67; column 5 lines 1-11; column 6 lines 15-45; column 11 lines 65-67; column 12 lines 1-63; figures 1-5);

circuitry associated with each of the electrodes (figures 1-5);

a processor coupled to the circuitry, wherein the processor is configured to initiate production of a plurality of modulation signals, to initiate application of each of the plurality of modulation signals to the plurality of electrodes via the circuitry, to interpret a sensed signal received from the touch-sensitive region produced by the

pointer, and to determine the position of the pointer with respect to the plurality of electrodes using the electrical effects (column 6 lines 15-45; column 13 lines 35-61; column 14 lines 40-65; figures 1-5).

However Gillespie fails to disclose a demodulator coupled to the touch-sensitive region, and a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of modulation signals as a function of a plurality of distinct digital codes, to initiate application of each of the plurality of modulation signals to the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the digital codes to discriminate electrical effects produced by the object upon at least one electrode, and to determine the position-based attribute of the object with respect to the plurality of electrodes using the electrical effects.

In a similar field of invention Umeda discloses a demodulator (100) coupled to the touch-sensitive region (figures 1-4), and a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of modulation signals as a function of a plurality of distinct digital codes, to initiate application of each of the plurality of modulation signals to the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the digital codes to discriminate electrical effects produced by the object upon at least one electrode, and to determine the position-based attribute of the object with respect to the plurality of electrodes using the electrical effects (paragraphs 19-20; paragraphs 88-99; paragraphs 112-125; paragraphs 131-144; figures 1-10).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie with Umeda by specifically providing a demodulator coupled to the touch-sensitive region, and a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of modulation signals as a function of a plurality of distinct digital codes, to initiate application of each of the plurality of modulation signals to the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the digital codes to discriminate electrical effects produced by the object upon at least one electrode, and to determine the position-based attribute of the object with respect to the plurality of electrodes using the electrical effects for the purpose of precisely calculating the position of the finger on the touch sensitive area.

Regarding claim 40, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the circuitry comprises an analog signal generator configured to generate a carrier signal and a modulator configured to amplitude modulate the carrier signal with each of the plurality of distinct digital codes to thereby produce the unique modulation signals (paragraphs 18-20; paragraphs 104-108; figures 1-10).

Regarding claim 46, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses a capacitor electrically coupled to at least some of the plurality of electrodes and to the demodulator (figures 1-5).

Regarding claim 48, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses the pointer is a finger (figure 1).

Regarding claim 49, Gillspie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the object is a stylus (column 4 lines 42-46).

Regarding claim 50, Gillespie and Umeda, the combiantion discloses everything as applied above, further Gillespie discloses wherein the electrodes are formed on a flexible substrate (column 9 lines 36-44).

Regarding claim 51, claim 51 discloses an apparatus and claim 1 describes a method for implementing that apparatus. Thus claim 51 is interpreted and thus rejected for the reasons set forth above in the rejection of claim 1. Thus claim 51 is rejected.

Regarding claim 52, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses determining the position of the pointer as the pointer moves with respect to the touch sensitive region (column 9 lines 3-35; figure 1).

Regarding claim 53, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the resultant signal is directly affected by the position of the pointer (column 9 lines 3-35; figure 1).

Regarding claim 54, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses the pointer is a finger (figure 1).

Regarding claim 55, Gillspie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the object is a stylus (column 4 lines 42-46).

Regarding claim 56, Gillspie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the electrodes are substantially rigidly fixed in position with respect to each other (column 4 lines 42-46).

Regarding claim 58, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the resultant signal is directly affected by the position of the pointer (column 9 lines 3-35; figure 1).

Regarding claim 59, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses the pointer is a finger (figure 1).

Regarding claim 60, Gillspie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the object is a stylus (column 4 lines 42-46).

Regarding claim 61, Gillspie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the electrodes are substantially rigidly fixed in position with respect to each other (column 4 lines 42-46).

Regarding claim 62, Gillspie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the electrodes are substantially rigidly fixed in position with respect to each other (column 4 lines 42-46).

Regarding claim 63, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the resultant signal is directly affected by the position of the pointer (column 9 lines 3-35; figure 1).

Regarding claim 65, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses the processor is configured for determining

the position of the pointer as the pointer moves with respect to the touch sensitive region (column 9 lines 3-35; figure 1).

3. Claims 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gillepie in view of Umeda and further in view of Hirano et al. (United States Patent 5,790,106), hereinafter referenced as Hirano.

Regarding claim 2, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose determining the position of the pointer with respect to the plurality of electrodes based upon a peak value of the electrical effects.

In a similar field of invention Hirano discloses determining the position of the pointer with respect to the plurality of electrodes based upon a peak value of the electrical effects (column 10 lines 26-65; figure 1; figure 8; figure 10).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Hirano by specifically providing determining the position of the pointer with respect to the plurality of electrodes based upon a peak value of the electrical effects for the purpose of precisely calculating the position of the pointing device on the touch pad.

4. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda and further in view of Zadesky et al. (United States Patent Application Publication 2003/0076306), hereinafter referenced as Zadesky.

Regarding claim 9, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose providing an output based

upon the position wherein the position-based attribute describes a velocity of the pointer.

In a similar field of invention Zadesky discloses providing an output based upon the position wherein the position-based attribute describes a velocity of the pointer (paragraph 41).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Zadesky by specifically providing an output based upon the position wherein the position-based attribute describes a velocity of the pointer for the purpose of precisely calculating the position of the finger on the touch sensitive area as it is moved across the touch sensitive area.

Regarding claim 10, Gillespie and Umeda, the combinatin discloses everything as applied above, however the combination fails to disclose an output based upon the position wherein the position-based attribute describes a acceleration of the pointer.

In a similar field of invention Zadesky discloses an output based upon the position wherein the position-based attribute describes an acceleration of the pointer (paragraph 41).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Zadesky by specifically providing an output based upon the position wherein the position-based attribute describes an acceleration of the pointer for the purpose of precisely identifying input from a user.

5. Claims 20 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda in view of Iwasaki et al. (United States Patent 6,621,487), hereinafter referenced as Iwasaki.

Regarding claim 20, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose wherein the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes.

In a similar field of invention Iwasaki discloses wherein the resultant signal is received as electrical effects obtained from an integrating capacitor Cs coupled to at least two of the plurality of electrodes (column 6 lines 54-67; column 7 lines 1-17; figures 1-2).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Iwasaki by specifically providing wherein the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes for the purpose of precisely identifying input from a user.

Regarding claim 47, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes.

In a similar field of invention Iwasaki discloses wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes (column 6 lines 54-67; column 7 lines 1-17; figures 1-2).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Iwasaki by specifically providing wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes for the purpose of precisely identifying input from a user.

6. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda in view of Ozluturk et al. (United States Patent 7,106,720), hereinafter referenced as Ozluturk.

Regarding claim 23, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose adjusting at least one of the distinct digital codes in response to the resultant signals.

In a similar field of invention Ozluturk discloses adjusting at least one of the distinct digital codes in response to the resultant signals (column 5 lines 23-67; column 6 lines 1-12; figures 3-4).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Ozluturk by specifically providing adjusting at least one of the distinct digital codes in response to the resultant signals for the purpose of adjusting signals based on the channel conditions to improve

the performance of receiving and demodulating signals to speed up the system (column 4 lines 24-34).

Regarding claim 24, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose adjusting at least one of the modulation signals in response to the resultant sensed signals.

In a similar field of invention Ozluturk discloses adjusting at least one of the modulation signals in response to the resultant sensed signals when the code is adjusted (column 5 lines 23-67; column 6 lines 1-12; figures 3-4).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Ozluturk by specifically providing adjusting at least one of the modulation signals in response to the resultant sensed signals for the purpose of adjusting signals based on the channel conditions to improve the performance of receiving and demodulating signals to speed up the system (column 4 lines 24-34).

9. Claims 25-27 and 57 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda in view of Bisset et al. (United States Patent 5,825,352), hereinafter referenced as Bisset.

Regarding claim 25, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose processing the resultant signal to determine a second position of a second pointer in proximity to the touch-sensitive region that is independent of the pointer.

In a similar field of invention Bisset discloses processing the resultant signal to determine a second position of a second pointer in proximity to the touch-sensitive region that is independent of the pointer (column 5 lines 6-60; figures 1-9).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Bisset by specifically providing processing the resultant signal to determine a second position of a second pointer in proximity to the touch-sensitive region that is independent of the pointer for the purpose of allowing multiple fingers to be used on a touch pad to input information quickly.

Regarding claim 26, Gillespie, Umeda and Bisset, the combination discloses everything as applied above, further Bisset discloses wherein the pointer and the second pointerare separate parts of a human hand (column 5 lines 6-60; figures 1-9).

Regarding claim 27, Umeda and Bisset, the combination discloses everything as applied above, further Bisset discloses rejecting information relating to the second pointer when the second pointer's peak value is not above the threshold value necessary for a finger to be considered present (column 5 lines 6-60; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

Regarding claim 57, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose determining a second position of an independent second pointer in proximity to the touch-sensitive region wherein the second position is determined from the electrical effects.

In a similar field of invention Bisset discloses determining a second position of an independent second pointer in proximity to the touch-sensitive region wherein the second position is determined from the electrical effects (column 5 lines 6-60; figures 1-9).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Bisset by specifically providing determining a second position of an independent second pointer in proximity to the touch-sensitive region wherein the second position is determined from the electrical effects for the purpose of allowing multiple fingers to be used on a touch pad to input information quickly.

Regarding claim 64, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose determining a second position of an independent second pointer in proximity to the touch-sensitive region wherein the second position is determined from the electrical effects.

In a similar field of invention Bisset discloses determining a second position of an independent second pointer in proximity to the touch-sensitive region wherein the second position is determined from the electrical effects (column 5 lines 6-60; figures 1-9).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Bisset by specifically providing determining a second position of an independent second pointer in proximity to the touch-sensitive region wherein the second position is determined from the

electrical effects for the purpose of allowing multiple fingers to be used on a touch pad to input information quickly.

10. Claims 28-29, and 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda and further in view of Benkley III (United States Patent Application Publication 2004/0081339), hereinafter referenced as Benkley.

Regarding claim 28, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses a pointer (figure 1), however the combination fails to disclose wherein the determining step comprises defining an image.

In a similar field of invention Benkley discloses wherein the determining step comprises defining an image of the object (paragraphs 53-54).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Benkley by specifically providing wherein the determining step comprises defining an image of the object for the purpose of precisely calculating the position of the finger on the touch sensitive area as it is moved across the touch sensitive area (paragraphs 53-54).

Regarding claim 29, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses a pointer (figure 1), however the combination fails to disclose wherein the image represents a two- dimensional topography of the object projected upon the touch-sensitive region.

In a similar field of invention Benkley discloses wherein the image represents a two-dimensional topography of the object projected upon the touch-sensitive region (paragraphs 53-54).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Benkley by specifically providing wherein the image represents a two- dimensional topography of the object projected upon the touch-sensitive region for the purpose of precisely calculating the position of the finger on the touch sensitive area as it is moved across the touch sensitive area (paragraphs 53-54).

Regarding claim 44, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses the pointer (figure 1), however the combination fails to disclose wherein presence of the object to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes.

In a similar field of invention Benkley discloses wherein presence of the object to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes (paragraphs 60-64; figures 2A-2B).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Benkley by specifically providing wherein presence of the object to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes for the purpose of precisely calculating the finger print for precise biometric identification (paragraphs 53-54).

Regarding claim 45, Gillespie, Umeda and Benkley, the combination discloses everything as applied above, further Umeda discloses wherein the at least two of the plurality of electrodes comprise a first electrode having a first orientation and a second electrode having a second orientation substantially perpendicular to the first orientation (figures 1-4).

11. Claims 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda in view of Benkley and further in view of Bisset.

Regarding claim 30, Gillespie and Umeda and Benkley, the combination discloses everything as applied above, however the combination fails to disclose processing the resultant signal to determine a position of a second pointer in proximity to the touch- sensitive region, the second pointer being independent of the pointer and having a second image.

In a similar field of invention Bisset discloses processing the resultant signal to determine a position of a second pointer in proximity to the touch- sensitive region, the second pointer being independent of the pointer and having a second image (column 5 lines 6-60; column 7 lines 1-34; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda and Benkley with Bisset by specifically providing processing the resultant signal to determine a position of a second pointer in proximity to the touch- sensitive region, the second pointer being independent

of the pointer and having a second image for the purpose of allowing multiple fingers to be used on a touch pad to input information quickly.

Regarding claim 31, Gillespie, Umeda, Benkley and Bisset, the combination discloses everything as applied above, further Bisset discloses tracking movements of the pointer and of the second pointer with respect to the touch-sensitive region (column 5 lines 6-60; column 7 lines 1-34; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

Regarding claim 32, Gillespie, Umeda, Benkley and Bisset, the combination discloses everything as applied above, further Bisset discloses determining whether the second pointer represents an undesired input, and if so, rejecting the second pointer if the peak input is below a threshold(column 5 lines 6-60; column 7 lines 1-34; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

12. Claims 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda in view of Yoshikawa et al. (United States Patent Application Publication 2003/0067449), hereinafter referenced as Yoshikawa.

Regarding claim 41, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user.

In a similar field of invention Yoshikawa discloses wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user (paragraph 8; paragraphs 83-90; figures 1-2).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Yoshikawa by specifically providing wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user for the purpose of providing feedback to a user to let the use know that input is being received (paragraphs 6-7; paragraph 25).

Regarding claim 42, Gillespie and Umeda and Yoshikawa, the combination discloses everything as applied above, further Yoshikawa discloses wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the electrical effects (paragraphs 24-33; paragraphs 81-90; figures 1-8).

Regarding claim 43, Gillespie and Umeda and Yoshikawa, the combination discloses everything as applied above, further Yoshikawa discloses wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the positions of the plurality of electrodes relative to each other (paragraphs 24-33; paragraphs 81-90; figures 1-8).

Response to Arguments

13. Applicant's arguments with respect to claims 1-65 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stuart McCommas whose telephone number is (571)270-3568. The examiner can normally be reached on Monday-Friday 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on (571)272-7687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Stuart McCommas
Patent Examiner
Art Unit 2629

SSM

/Alexander Eisen/
Supervisory Patent Examiner, Art Unit 2629

Notice of References Cited	Application/Control No. 11/274,999	Applicant(s)/Patent Under Reexamination REYNOLDS, J. KURTH	
	Examiner Stuart McCommas	Art Unit 2629	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,790,106	08-1998	Hirano et al.	345/173
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Stuart McCommas	2629

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/15/2009	07/10/2009	12/18/2009						
	1	✓	✓	✓						
	2	✓	✓	✓						
	3	✓	✓	✓						
	4	✓	✓	✓						
	5	✓	✓	✓						
	6	✓	✓	✓						
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	30	✓	✓	✓						
	31	✓	✓	✓						
	32	✓	✓	✓						
	33	✓	✓	✓						
	34	✓	✓	✓						
	35	✓	✓	✓						
	36	✓	✓	✓						

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Stuart McCommas	2629

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
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	62			✓						
	63			✓						
	64			✓						
	65			✓						

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Stuart McCommas	2629

SEARCHED			
Class	Subclass	Date	Examiner
345	173	1/15/2009	SSM

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Search Attached	1/15/2009	SSM
EAST Search Updated	7/10/2009	SSM
EAST Search Updated	12/18/2009	SSM

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	345/173.ccls. and capacitive and digital code and modulate	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/12/18 15:49
L2	46	345/173.ccls. and capacitive and digital code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/12/18 15:49
S1	19	US-4170025-$.DID. OR US-4459541-$.DID. OR US-5305017-$.DID. OR US-5666113-$.DID. OR US-5790106-$.DID. OR US-5825352-$.DID. OR US-5861875-$.DID. OR US-5917906-$.DID. OR US-6570557-$.DID. OR US-6704005-$.DID. OR US-6771280-$.DID. OR US-6788288-$.DID. OR US-20030030628-$.DID. OR US-20030035570-$.DID. OR US-20040081339-$.DID. OR US-20050005703-$.DID. OR US-20050024065-$.DID. OR US-20050052425-$.DID. OR US-20050073324-$.DID.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:04
S2	2	US-20020049070-$.DID. OR US-20050122785-$.DID.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:05
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S4	1	"5880411".pn.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:18
S5	18	345/173.ccls. and capacitive and spread spectrum	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:21

S6	1	345/173.ccls. and capacitive and change code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:30
S7	35	345/173.ccls. and capacitive and digital code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:32
S8	1	345/173.ccls. and capacitive and digital code and modulation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:32
S9	1	345/173.ccls. and capacitive and digital code and modulate	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:32
S10	35	345/173.ccls. and capacitive and digital code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:32
S11	70	345/173.ccls. and capacitive and modulate	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:33
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S14	2	S12 and baseline	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:42
S15	6	S12 and change with position	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:43
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S22	195	345/173.ccls. and capacitive and acceleration	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:56
S23	6	345/173.ccls. and capacitive and (acceleration with detect)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:56
S24	71	345/173.ccls. and capacitive and (acceleration with finger)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:59
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S28	0	"20050073324" and orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:32
S29	693	345/173.ccls. and orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:32
S30	324	345/173.ccls. and orthogonal and capacitive	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:32
S31	9	345/173.ccls. and orthogonal with code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:32

S32	0	"20050073324" and correlation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:34
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S35	0	"20050073324" and integrating	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:42
S36	2	S12 and integrating	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:42
S37	0	S12 and integrating capacitor	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:42
S38	31	345/173.ccls. and integrating capacitor	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:43
S39	19	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$ or US-20030076306-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$ or US-6621487-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/01/13 12:06
S40	6	S39 and code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:06
S41	1339	345/173.ccls. and code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:13

S42	112	345/173.ccls. and code with (sensed or detected or adjust)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:13
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S45	0	code generation with channel]	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:20
S46	275	code generation with channel	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:20
S47	0	"345.173,ccks", and code generation with channel	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:34
S48	0	"345.173,ccks", and code generation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:34
S49	0	"345.173,ccls." and code generation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:34
S50	6	345/173.ccls. and code generation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:35
S51	0	(11/274999).APP.	USPAT; USOCR	ADJ	ON	2009/01/13 12:36
S52	0	adjust code with reciever	USPAT; USOCR	ADJ	ON	2009/01/13 12:37
S53	0	adjusting code with reciever	USPAT; USOCR	ADJ	ON	2009/01/13 12:37
S54	1974	walsh code	USPAT; USOCR	ADJ	ON	2009/01/13 12:37
S55	17	walsh code with adjust	USPAT; USOCR	ADJ	ON	2009/01/13 12:37
S56	4005	code with adjust	USPAT; USOCR	ADJ	ON	2009/01/13 12:40
S57	33802	code with change	USPAT; USOCR	ADJ	ON	2009/01/13 12:40
S58	65426	(adjust or change) with code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:43

S59	112	"345".clss. and (adjust or change) with code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:44
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S61	1409	(update with code) and cdma	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:37
S62	134	(update code) and cdma	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:37
S63	24	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$ or US-20030076306-$ or US-20020008692-$ or US-20040136445-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$ or US-6621487-$ or US-3605019-$ or US-5204876-$ or US-7106720-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/01/13 14:44

S64	16	S63 and hand and finger	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:44
S65	1	S63 and hand and finger and reject	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:46
S66	2	S63 and fingerprint and image	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:49
S67	24	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$ or US-20030076306-$ or US-20020008692-$ or US-20040136445-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$ or US-6621487-$ or US-3605019-$ or US-5204876-$ or US-7106720-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/01/13 15:01
S68	0	S67 and amplitude modulating	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:01
S69	2	S67 and amplitude modulation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:01
S70	0	S67 and guard signal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:02
S71	1	S67 and ground signal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:06
S72	13	S67 and ground	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:06

S73	1	S67 and (ground with row)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:10
S74	1	S67 and tactile feedback	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:14
S75	265	345/173.ccls. and tactile feedback	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:14
S76	152	345/173.ccls. and tactile feedback and capacitive	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:14
S77	14	S67 and (stylus or pen)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:19
S78	9	S67 and (flexible or bend)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:20
S79	25	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$ or US-20030076306-$ or US-20020008692-$ or US-20040136445-$ or US-20030067449-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$ or US-6621487-$ or US-3605019-$ or US-5204876-$ or US-7106720-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/12/15 13:11
S80	13	S79 and peak	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/12/15 13:12

12/18/2009 3:49:43 PM
C:\Documents and Settings\smccommas\My Documents\EAST\Workspaces

\11274999touchsensor.wsp

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/274,999	11/15/2005	J. Kurth Reynolds	028.0013	7508

69819 7590 04/02/2010

INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

EXAMINER	
MCCOMMAS, STUART S	
ART UNIT	PAPER NUMBER
2629	

NOTIFICATION DATE	DELIVERY MODE
04/02/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@ifllaw.com

Interview Summary	Application No.	Applicant(s)	
	11/274,999	REYNOLDS, J. KURTH	
	Examiner	Art Unit	
	Stuart McCommas	2629	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Stuart McCommas*. (3)_____.

(2) *Brett Carlson*. (4)_____.

Date of Interview: *26 March 2010*.

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☒ No.
If Yes, brief description: _____.

Claim(s) discussed: *1*.

Identification of prior art discussed: *Umeda, Gillespie*.

Agreement with respect to the claims f)☐ was reached. g)☐ was not reached. h)☒ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *Applicant's representative further explained the invention and described reasons why the combination of the Umeda and Gillespie reference was improper based on the claim language. Applicant's representative suggested claim amendments for the invention.*.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

/Stuart McCommas/ Examiner, Art Unit 2629	

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

———

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	J. Kurth REYNOLDS	Confirmation No.: 7508
Appl. No.	:	11/274,999	
Filed	:	November 15, 2005	
Art Unit	:	2629	
Examiner	:	Stuart McCommas	
Docket No.	:	028.0013	
Title	:	METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES	

AMENDMENT AND RESPONSE FILED UNDER 37 C.F.R. § 1.111

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

In response to the Office Action mailed January 5, 2010, please amend the above-identified application and consider the remarks that follow under 37 C.F.R. § 1.111.

Amendments to the Claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks/Arguments begin on page 12 of this paper.

Amendments to the Claims

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of detecting a position of a pointer with respect to a touch-sensitive region comprising a plurality of electrodes, the method comprising the steps of:

simultaneously applying a first one of a plurality of distinct modulation signals to an associated ~~at least one~~ first one of the plurality of electrodes and a second one of the plurality of distinct modulation signals to an associated second one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the pointer, wherein each of the plurality of distinct modulation signals is based on a different one of a plurality of distinct digital codes;

demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the pointer; and

determining the position of the pointer with respect to the plurality of electrodes from the electrical effects.

2. (Previously Presented) The method of claim 1 wherein the determining step comprises determining the position of the pointer with respect to the plurality of electrodes based upon a peak value of the electrical effects.

3. (Previously Presented) The method of claim 1 wherein the determining step comprises determining the position of the pointer with respect to the plurality of electrodes based upon a computed centroid of the electrical effects.

4. (Previously Presented) The method of claim 1 wherein the determining step comprises determining a difference between the electrical effects associated with at least two electrodes.

5. (Original) The method of claim 1 wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects.

6. (Previously Presented) The method of claim 1 wherein determining comprises determining the position of the pointer as the pointer moves with respect to the touch sensitive region.

7. (Previously Presented) The method of claim 1 further comprising providing an output based upon the position that describes a motion of the pointer with respect to the plurality of electrodes.

8. (Previously Presented) The method of claim 1 further comprising providing an output based upon the position that describes a change in the position from a previous position.

9. (Previously Presented) The method of claim 1 further comprising providing an output based upon the position that describes a velocity of the pointer.

10. (Previously Presented) The method of claim 1 further comprising providing an output based upon the position that describes an acceleration of the pointer.

11. (Previously Presented) The method of claim 1 wherein each of the plurality of distinct digital codes is substantially orthogonal to the remainder of the plurality of distinct digital codes.

12. (Previously Presented) The method of claim 1 wherein each of the plurality of distinct digital codes is a substantial portion of a code derived from a maximum length shift register sequence.

13. (Previously Presented) The method of claim 1 wherein at least some of the plurality of distinct digital codes are selected to avoid the effects of noise in the resultant signal.

14. (Original) The method of claim 1 further comprising the step of generating each of the plurality of distinct digital codes.

15. (Original) The method of claim 14 wherein the generating step comprises producing the plurality of distinct digital codes using at least one shift register.

16. (Previously Presented) The method of claim 1 wherein the applying step comprises applying modulation signals substantially simultaneously to at least two of the plurality of electrodes.

17. (Previously Presented) The method of claim 1 wherein the demodulating step comprises receiving signals from at least two of the plurality of electrodes on a common signal path as the resultant signal.

18. (Previously Presented) The method of claim 1 wherein the electrical effects result from an electrical coupling between the pointer and at least some of the associated electrodes.

19. (Original) The method of claim 18 wherein the electrical coupling is a capacitive coupling.

20. (Previously Presented) The method of claim 18 wherein the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes.

21. (Previously Presented) The method of claim 1 further comprising the steps of:

applying a plurality of complementary modulation signals to the associated at least one of the plurality of electrodes to obtain a plurality of complementary sensed signals, the plurality of complementary modulation signals based on complements of the plurality of distinct digital codes.

22. (Original) The method of claim 21 further comprising the steps of:

demodulating each of the plurality of complementary sensed signals using the distinct digital code associated with the at least one of the plurality of electrodes to thereby identify complementary electrical effects from the plurality of electrodes; and

comparing the electrical effects with the complementary electrical effects to thereby perform dual differential conversion.

23. (Previously Presented) The method of claim 1 further comprising the step of adjusting at least one of the distinct digital codes in response to the resultant signals.

24. (Previously Presented) The method of claim 1 further comprising the step of adjusting at least one of the modulation signals in response to the resultant signal.

25. (Previously Presented) The method of claim 1 further comprising the step of processing the resultant signal to determine a second position of a second pointer in proximity to the touch-sensitive region that is independent of the pointer.

26. (Previously Presented) The method of claim 25 wherein the pointer and the second pointer are separate parts of a human hand.

27. (Previously Presented) The method of claim 25 further comprising the step of rejecting information relating to the second pointer.

28. (Previously Presented) The method of claim 1 wherein the determining step comprises defining an image of the pointer.

29. (Previously Presented) The method of claim 28 wherein the image represents a two-dimensional topography of the pointer projected upon the touch-sensitive region.

30. (Previously Presented) The method of claim 28 further comprising the step of processing the resultant signal to determine a position of a second pointer in proximity to the touch-sensitive region, the second pointer being independent of the pointer and having a second image.

31. (Previously Presented) The method of claim 30 further comprising the step of tracking movements of the pointer and of the second pointer with respect to the touch-sensitive region.

32. (Previously Presented) The method of claim 30 further comprising the step of determining whether the second pointer represents an undesired input, and if so, rejecting the second pointer.

33. (Original) The method of claim 1 wherein the distinct digital codes have more than two states.

34. (Previously Presented) The method of claim 1 wherein the applying step comprises amplitude modulating a carrier signal with each of the plurality of distinct digital codes.

35. (Original) The method of claim 1 wherein the plurality of electrodes comprises a first plurality of electrodes having a first orientation and a second plurality of electrodes having a second orientation.

36. (Previously Presented) The method of claim 35 wherein each of the plurality of modulation signals is applied to the first plurality of electrodes and received via the second plurality of electrodes.

37. (Original) The method of claim 35 further comprising the step of applying a guard signal to at least one inactive electrode of the second plurality of electrodes.

38. (Previously Presented) The method of claim 1 wherein the applying step comprises applying a same one of the plurality of modulation signals to at least two of the plurality of electrodes.

39. (Currently Amended) A touch-sensitive device for detecting a position of a pointer, the device comprising:

a touch-sensitive region comprising a plurality of electrodes having electrical characteristics configured to be affected by the proximity of the pointer;

circuitry associated with each of the electrodes;

a demodulator coupled to the touch-sensitive region; and

a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of modulation signals, wherein each of the plurality of modulation signals is produced as a function of a different one of a plurality of distinct digital codes, to initiate simultaneous application of ~~each~~ a first one of the plurality of modulation signals to a first one the plurality of electrodes and a second one of the plurality of modulation signals to a second one of the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the digital codes to discriminate electrical effects produced by the pointer upon at least one electrode, and to determine the position of the pointer with respect to the plurality of electrodes using the electrical effects.

40. (Previously Presented) The device of claim 39 wherein the circuitry comprises an analog signal generator configured to generate a carrier signal and a modulator configured to amplitude modulate the carrier signal with each of the plurality of distinct digital codes to thereby produce the unique modulation signals.

41. (Original) The device of claim 39 wherein the touch sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user.

42. (Original) The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the electrical effects.

43. (Original) The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the positions of the plurality of electrodes relative to each other.

44. (Previously Presented) The device of claim 39 wherein presence of the pointer to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes.

45. (Original) The device of claim 44 wherein the at least two of the plurality of electrodes comprise a first electrode having a first orientation and a second electrode having a second orientation substantially perpendicular to the first orientation.

46. (Original) The device of claim 39 further comprising a capacitor electrically coupled to at least some of the plurality of electrodes and to the demodulator.

47. (Original) The device of claim 46 wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes.

48. (Previously Presented) The device of claim 39 wherein the pointer is a finger.

49. (Previously Presented) The device of claim 39 wherein the pointer is a stylus.

50. (Previously Presented) The device of claim 39 wherein the electrodes are formed on a flexible substrate.

51. (Currently Amended) A device for detecting a position of a pointer with respect to a touch-sensitive region comprising a plurality of electrodes, the device comprising:

means for simultaneously applying a first one of a plurality of distinct modulation signals to an associated ~~at least one~~ first one of the plurality of electrodes and a second one of the plurality of distinct modulation signals to an associated second one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the pointer, wherein each of the plurality of distinct modulation signals is based on a different one of a plurality of distinct digital codes;

means for demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the pointer; and

means for determining the position of the pointer with respect to the plurality of electrodes from the electrical effects.

52 (Previously Presented). The device of claim 51 wherein the means for determining is configured to determine the position of the pointer as the pointer moves with respect to the touch sensitive region.

53 (Previously Presented). The device of claim 51 wherein the resultant signal is directly affected by the position of the pointer.

54 (Previously Presented). The device of claim 51 wherein the pointer is a finger.

55 (Previously Presented). The device of claim 51 wherein the pointer is a stylus.

56 (Previously Presented). The device of claim 51 wherein the electrodes are substantially rigidly fixed in position with respect to each other.

57 (Previously Presented). The device of claim 51 wherein the determining means is further configured to determine a second position of an independent second pointer that is in

proximity to the touch-sensitive region, wherein the second position is determined from the electrical effects.

58 (Previously Presented). The method of claim 1 wherein the resultant signal is directly affected by the position of the pointer.

59 (Previously Presented). The method of claim 1 wherein the pointer is a finger.

60 (Previously Presented). The method of claim 1 wherein the pointer is a stylus.

61 (Previously Presented). The method of claim 1 wherein the electrodes are substantially rigidly fixed in position with respect to each other.

62 (Previously Presented). The device of claim 39 wherein the electrodes are substantially rigidly fixed in position with respect to each other.

63 (Previously Presented). The device of claim 39 wherein the resultant signal is directly affected by the position of the pointer.

64 (Previously Presented). The device of claim 39 wherein the processor is further configured to determine a second position of an independent second pointer that is in proximity to the touch-sensitive region, wherein the second position is determined from the electrical effects.

65 (Previously Presented). The device of claim 39 wherein the processor is further configured to determine the position of the pointer as the pointer moves with respect to the touch sensitive region.

66 (New). The method of claim 1 wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes.

 Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

67 (New). The device of claim 39 wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes.

68 (New). The device of claim 51 wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes.

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

REMARKS

We hereby respond to the Non-Final Office Action dated January 5, 2010. No new matter is added by this Response.

Examiner Interview

We greatly appreciate the courtesy extended by Examiner McCommas in the telephonic interview on March 26, 2010. During the interview, we discussed the differences between our claims and the cited Gillespie and Umeda references.

Prior Art Rejections

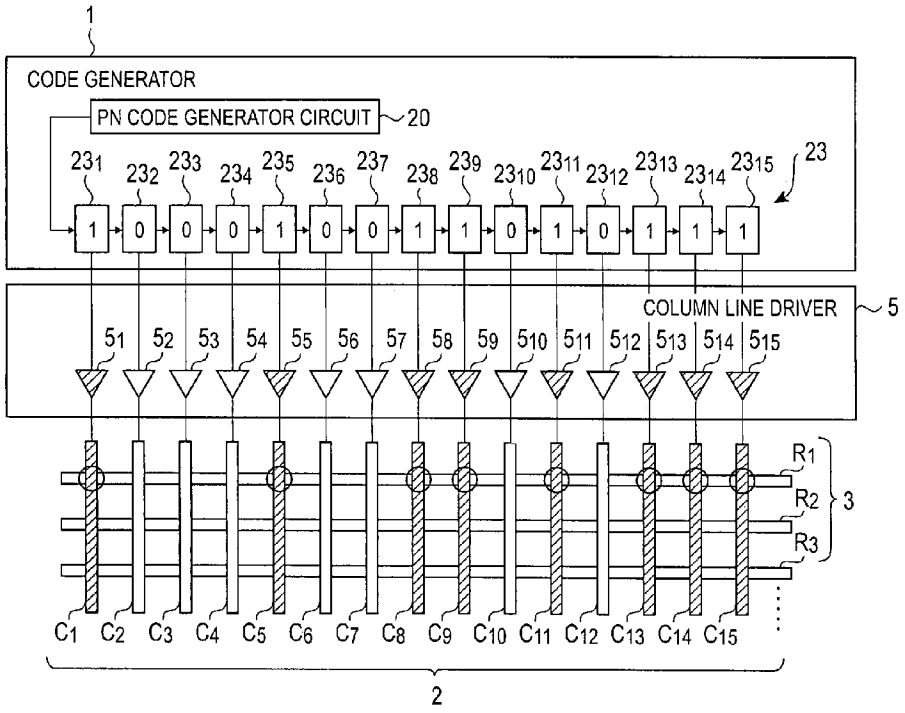
The Office Action requests clarification of the differences between our claims and the Section 103 combination of US Patent 5,880,441 ("Gillespie") and US Patent Publication No. 2005/0073324 ("Umeda"). We respectfully traverse the rejection because even if the two references were combined, our claims recite additional features that would not be found in the resulting combination. We further dispute that a person skilled in the art would combine the two references.

Each of our independent claims recites "simultaneous application" of first and second modulation signals that are each based upon distinct digital codes. One example of this feature is described in paragraph 0031 of our Specification.

The Office Action rightly acknowledges that the Gillespie reference is silent as to the use of digital codes. The reference certainly does not go so far as to suggest the simultaneous application of multiple signals that are based upon distinct digital codes.

While the Office Action cites the Umeda reference as teaching the use of digital codes, the Umeda reference does not teach the full extent of our claim language. In particular, Umeda simply uses a single code as a "column drive signal" that selects active column lines. *See, e.g.*, Umeda's Abstract at lines 4-8; *see also* Umeda's paragraphs 0090 and 0093. Umeda's FIG. 8 (reproduced below) shows how a single PN code is applied to column line driver circuit to select the active columns, as follows:

FIG. 8



Even to the extent that Umeda does mention digital codes, it does so only in the context of sequential inputs to a column line driver circuit. The reference does not contemplate the simultaneous application of first and second signals based upon distinct digital codes, as recited in our independent claims. Umeda (considered alone or in combination with Gillespie) therefore fails to suggest the full extent of our claim language.

Our claims (including many of the various dependent claims) contain additional features that further distinguish from the combination of Gillespie and Umeda. An analysis of these features is cumulative, however, and therefore unnecessary at this time. We do, however, reserve the right to point out additional features of our claims at a later point in prosecution, or on appeal to the Board of Patent Appeals and Interferences.

We further dispute that a person skilled in the art would combine the teachings of Gillespie and Umeda. The Gillespie reference describes a device that emphasizes parallel drive techniques. *See* Gillespie at col. 6, lines 9-40. As we discussed in the telephonic interview, modulating Gillespie's parallel drive signals using the Umeda coding technique would degrade the performance by reducing the overall sensing

power and/or increasing the amount of noise in the output signal. We therefore respectfully dispute that a person skilled in the art would seek to combine Gillespie and Umeda with each other. As we have noted previously, our claims go beyond the combined teachings of Gillespie and Umeda to arrive at new methods and devices that are not suggested by the cited combination.

We have added several new claims that recite the application of "strictly" orthogonal codes. As evidenced by Umeda's FIG. 7A, the codes described in the Umeda reference have a cross-correlation of -1, meaning that they are not strictly orthogonal. We therefore respectfully request examination of the new dependent claims.

Conclusion

In view of the amendments to the claims and the above remarks, it is respectfully submitted that all of the issues identified in the Office Action have all been overcome. Accordingly, we respectfully submit that the application is in condition for allowance, and such allowance is now earnestly requested.

No official fee is believed to be due in connection with this Response, other than the fees for the additional claims that are addressed elsewhere in this submittal. If, however, any time extension or additional fee is required to consider this response or to otherwise prevent abandonment of this application, please consider this as a request for an extension of time and as authorization to charge Deposit Account No. 50-2091 for any fees that may be due.

Should the Examiner have any questions or suggestions that would place the Application in better form, Applicant's counsel would welcome a telephone call at (480) 385-5060.

Respectfully submitted,

INGRASSIA, FISHER & LORENZ P.C.

Dated: April 5, 2010

By: /BRETT A. CARLSON/
Brett A. Carlson
Reg. No. 39,928
bcarlson@ifllaw.com

Ingrassia, Fisher & Lorenz PC
Customer No. 69,819
480-385-5060

Electronic Patent Application Fee Transmittal

Application Number:	11274999
Filing Date:	15-Nov-2005
Title of Invention:	Methods and systems for detecting a position-based attribute of an object using digital codes
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Filer:	Brett Carlson/Missy Burbank
Attorney Docket Number:	028.0013

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	1202	3	52	156
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**156**

Electronic Acknowledgement Receipt

EFS ID:	7354890
Application Number:	11274999
International Application Number:	
Confirmation Number:	7508
Title of Invention:	Methods and systems for detecting a position-based attribute of an object using digital codes
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Customer Number:	69819
Filer:	Brett Carlson
Filer Authorized By:	
Attorney Docket Number:	028.0013
Receipt Date:	05-APR-2010
Filing Date:	15-NOV-2005
Time Stamp:	22:23:36
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$156
RAM confirmation Number	5967
Deposit Account	502091
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

Shenzhen Huiding Tech. Co., Ltd. Exhibit 1013

1		20100405_Response.pdf	251831 f5393473e6be7cfa439341790ecf3287f7aa4bc8	yes	14

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	11
Applicant Arguments/Remarks Made in an Amendment	12	14

Warnings:

Information:

2	Fee Worksheet (PTO-875)	fee-info.pdf	30128 d35299d8bd831c8b90fb074f3db218d551303aeb	no	2

Warnings:

Information:

Total Files Size (in bytes):	281959

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/274,999	Filing Date 11/15/2005	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	04/05/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 68	Minus	** 65	= 3	X $ =		OR	X $52=	156
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	**156**

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
//TERRANCE LAWRENCE//

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	11274999
Filing Date	2005-11-15
First Named Inventor	J. Kurth Reynolds
Art Unit	2629
Examiner Name	Stuart McCommas
Attorney Docket Number	028.0013

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4733222		1998-03-22	Evans	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	11274999
	Filing Date	2005-11-15
	First Named Inventor	J. Kurth Reynolds
	Art Unit	2629
	Examiner Name	Stuart McCommas
	Attorney Docket Number	028.0013

	1		☐

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	11274999
	Filing Date	2005-11-15
	First Named Inventor	J. Kurth Reynolds
	Art Unit	2629
	Examiner Name	Stuart McCommas
	Attorney Docket Number	028.0013

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/BRETT A. CARLSON/	Date (YYYY-MM-DD)	2010-04-28
Name/Print	Brett A. Carlson	Registration Number	39,928

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	11274999
Filing Date:	15-Nov-2005
Title of Invention:	Methods and systems for detecting a position-based attribute of an object using digital codes
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Filer:	Brett Carlson/Missy Burbank
Attorney Docket Number:	028.0013

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt

EFS ID:	7503756
Application Number:	11274999
International Application Number:	
Confirmation Number:	7508
Title of Invention:	Methods and systems for detecting a position-based attribute of an object using digital codes
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Customer Number:	69819
Filer:	Brett Carlson/Missy Burbank
Filer Authorized By:	Brett Carlson
Attorney Docket Number:	028.0013
Receipt Date:	28-APR-2010
Filing Date:	15-NOV-2005
Time Stamp:	16:14:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	2632
Deposit Account	502091
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

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1	Information Disclosure Statement (IDS) Filed (SB/08)	20100428_IDS.pdf	762806 01b249c2f5c7024985c9a3da969fabc6f5e39857	no	4
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	30344 3b731bc4856de09c954168933d5fc9bd2cf712bf	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	793150	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	J. Kurth REYNOLDS	Confirmation No.: 7508
Appl. No.	:	11/274,999	
Filed	:	November 15, 2005	
Art Unit	:	2629	
Examiner	:	Stuart McCommas	
Docket No.	:	028.0013	
Title	:	METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES	

RESPONSE FILED UNDER 37 C.F.R. § 1.111(a)(2)

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Please amend the above-identified application and consider the remarks that follow under 37 C.F.R. § 1.111(a)(2). These amendments simply clarify the

Amendments to the Claims are reflected in the listing of claims that begins on page 2 of this paper.

Remarks/Arguments begin on page 12 of this paper.

Amendments to the Claims

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously Presented) A method of detecting a position of a pointer with respect to a touch-sensitive region comprising a plurality of electrodes, the method comprising the steps of:

simultaneously applying a first one of a plurality of distinct modulation signals to an associated first one of the plurality of electrodes and a second one of the plurality of distinct modulation signals to an associated second one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the pointer, wherein each of the plurality of distinct modulation signals is based on a different one of a plurality of distinct digital codes;

demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the pointer; and

determining the position of the pointer with respect to the plurality of electrodes from the electrical effects.

2. (Previously Presented) The method of claim 1 wherein the determining step comprises determining the position of the pointer with respect to the plurality of electrodes based upon a peak value of the electrical effects.

3. (Previously Presented) The method of claim 1 wherein the determining step comprises determining the position of the pointer with respect to the plurality of electrodes based upon a computed centroid of the electrical effects.

4. (Previously Presented) The method of claim 1 wherein the determining step comprises determining a difference between the electrical effects associated with at least two electrodes.

5. (Original) The method of claim 1 wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects.

6. (Previously Presented) The method of claim 1 wherein determining comprises determining the position of the pointer as the pointer moves with respect to the touch sensitive region.

7. (Previously Presented) The method of claim 1 further comprising providing an output based upon the position that describes a motion of the pointer with respect to the plurality of electrodes.

8. (Previously Presented) The method of claim 1 further comprising providing an output based upon the position that describes a change in the position from a previous position.

9. (Previously Presented) The method of claim 1 further comprising providing an output based upon the position that describes a velocity of the pointer.

10. (Previously Presented) The method of claim 1 further comprising providing an output based upon the position that describes an acceleration of the pointer.

11. (Previously Presented) The method of claim 1 wherein each of the plurality of distinct digital codes is substantially orthogonal to the remainder of the plurality of distinct digital codes.

12. (Previously Presented) The method of claim 1 wherein each of the plurality of distinct digital codes is a substantial portion of a code derived from a maximum length shift register sequence.

13. (Previously Presented) The method of claim 1 wherein at least some of the plurality of distinct digital codes are selected to avoid the effects of noise in the resultant signal.

14. (Original) The method of claim 1 further comprising the step of generating each of the plurality of distinct digital codes.

15. (Original) The method of claim 14 wherein the generating step comprises producing the plurality of distinct digital codes using at least one shift register.

16. (Currently Amended) The method of claim 1 wherein the applying step comprises applying a same one of the plurality of distinct modulation signals substantially simultaneously to at least two of the plurality of electrodes.

17. (Previously Presented) The method of claim 1 wherein the demodulating step comprises receiving signals from at least two of the plurality of electrodes on a common signal path as the resultant signal.

18. (Previously Presented) The method of claim 1 wherein the electrical effects result from an electrical coupling between the pointer and at least some of the associated electrodes.

19. (Original) The method of claim 18 wherein the electrical coupling is a capacitive coupling.

20. (Previously Presented) The method of claim 18 wherein the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes.

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21. (Currently Amended) The method of claim 1 further comprising the steps of:

applying a plurality of complementary modulation signals to at least one of the associated ~~at least~~ first one of the plurality of electrodes and the associated second one of the plurality of electrodes to obtain a plurality of complementary sensed signals, the plurality of complementary modulation signals based on complements of the plurality of distinct digital codes.

22. (Currently Amended) The method of claim 21 further comprising the steps of:

demodulating each of the plurality of complementary sensed signals using the distinct digital code associated with the at least one of the associated first one of the plurality of electrodes and the associated second one of the plurality of electrodes to thereby identify complementary electrical effects from the plurality of electrodes; and

comparing the electrical effects with the complementary electrical effects to thereby perform dual differential conversion.

23. (Previously Presented) The method of claim 1 further comprising the step of adjusting at least one of the distinct digital codes in response to the resultant signals.

24. (Currently Amended) The method of claim 1 further comprising the step of adjusting at least one of the distinct modulation signals in response to the resultant signal.

25. (Previously Presented) The method of claim 1 further comprising the step of processing the resultant signal to determine a second position of a second pointer in proximity to the touch-sensitive region that is independent of the pointer.

26. (Previously Presented) The method of claim 25 wherein the pointer and the second pointer are separate parts of a human hand.

27. (Previously Presented) The method of claim 25 further comprising the step of rejecting information relating to the second pointer.

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28. (Previously Presented) The method of claim 1 wherein the determining step comprises defining an image of the pointer.

29. (Previously Presented) The method of claim 28 wherein the image represents a two-dimensional topography of the pointer projected upon the touch-sensitive region.

30. (Previously Presented) The method of claim 28 further comprising the step of processing the resultant signal to determine a position of a second pointer in proximity to the touch-sensitive region, the second pointer being independent of the pointer and having a second image.

31. (Previously Presented) The method of claim 30 further comprising the step of tracking movements of the pointer and of the second pointer with respect to the touch-sensitive region.

32. (Previously Presented) The method of claim 30 further comprising the step of determining whether the second pointer represents an undesired input, and if so, rejecting the second pointer.

33. (Original) The method of claim 1 wherein the distinct digital codes have more than two states.

34. (Previously Presented) The method of claim 1 wherein the applying step comprises amplitude modulating a carrier signal with each of the plurality of distinct digital codes.

35. (Original) The method of claim 1 wherein the plurality of electrodes comprises a first plurality of electrodes having a first orientation and a second plurality of electrodes having a second orientation.

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36. (Currently Amended) The method of claim 35 wherein each of the plurality of distinct modulation signals is applied to the first plurality of electrodes and received via the second plurality of electrodes.

37. (Original) The method of claim 35 further comprising the step of applying a guard signal to at least one inactive electrode of the second plurality of electrodes.

38. (Currently Amended) The method of claim 1 wherein the applying step comprises applying a same one of the plurality of distinct modulation signals to at least two of the plurality of electrodes.

39. (Currently Amended) A touch-sensitive device for detecting a position of a pointer, the device comprising:

a touch-sensitive region comprising a plurality of electrodes having electrical characteristics configured to be affected by the proximity of the pointer;

circuitry associated with each of the electrodes;

a demodulator coupled to the touch-sensitive region; and

a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of distinct modulation signals, wherein each of the plurality of distinct modulation signals is produced as a function of a different one of a plurality of distinct digital codes, to initiate simultaneous application of a first one of the plurality of distinct modulation signals to a first one the plurality of electrodes and a second one of the plurality of distinct modulation signals to a second one of the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the distinct digital codes to discriminate electrical effects produced by the pointer upon at least one electrode, and to determine the position of the pointer with respect to the plurality of electrodes using the electrical effects.

40. (Currently Amended) The device of claim 39 wherein the circuitry comprises an analog signal generator configured to generate a carrier signal and a modulator configured to

amplitude modulate the carrier signal with each of the plurality of distinct digital codes to thereby produce the ~~unique~~ distinct modulation signals.

41. (Original) The device of claim 39 wherein the touch sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user.

42. (Original) The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the electrical effects.

43. (Original) The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the positions of the plurality of electrodes relative to each other.

44. (Previously Presented) The device of claim 39 wherein presence of the pointer to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes.

45. (Original) The device of claim 44 wherein the at least two of the plurality of electrodes comprise a first electrode having a first orientation and a second electrode having a second orientation substantially perpendicular to the first orientation.

46. (Original) The device of claim 39 further comprising a capacitor electrically coupled to at least some of the plurality of electrodes and to the demodulator.

47. (Original) The device of claim 46 wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes.

48. (Previously Presented) The device of claim 39 wherein the pointer is a finger.

49. (Previously Presented) The device of claim 39 wherein the pointer is a stylus.

50. (Previously Presented) The device of claim 39 wherein the electrodes are formed on a flexible substrate.

51. (Previously Presented) A device for detecting a position of a pointer with respect to a touch-sensitive region comprising a plurality of electrodes, the device comprising:

means for simultaneously applying a first one of a plurality of distinct modulation signals to an associated first one of the plurality of electrodes and a second one of the plurality of distinct modulation signals to an associated second one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the pointer, wherein each of the plurality of distinct modulation signals is based on a different one of a plurality of distinct digital codes;

means for demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the pointer; and

means for determining the position of the pointer with respect to the plurality of electrodes from the electrical effects.

52 (Previously Presented). The device of claim 51 wherein the means for determining is configured to determine the position of the pointer as the pointer moves with respect to the touch sensitive region.

53 (Previously Presented). The device of claim 51 wherein the resultant signal is directly affected by the position of the pointer.

54 (Previously Presented). The device of claim 51 wherein the pointer is a finger.

55 (Previously Presented). The device of claim 51 wherein the pointer is a stylus.

56 (Previously Presented). The device of claim 51 wherein the electrodes are substantially rigidly fixed in position with respect to each other.

57 (Previously Presented). The device of claim 51 wherein the determining means is further configured to determine a second position of an independent second pointer that is in proximity to the touch-sensitive region, wherein the second position is determined from the electrical effects.

58 (Previously Presented). The method of claim 1 wherein the resultant signal is directly affected by the position of the pointer.

59 (Previously Presented). The method of claim 1 wherein the pointer is a finger.

60 (Previously Presented). The method of claim 1 wherein the pointer is a stylus.

61 (Previously Presented). The method of claim 1 wherein the electrodes are substantially rigidly fixed in position with respect to each other.

62 (Previously Presented). The device of claim 39 wherein the electrodes are substantially rigidly fixed in position with respect to each other.

63 (Previously Presented). The device of claim 39 wherein the resultant signal is directly affected by the position of the pointer.

64 (Previously Presented). The device of claim 39 wherein the processor is further configured to determine a second position of an independent second pointer that is in proximity to the touch-sensitive region, wherein the second position is determined from the electrical effects.

65 (Previously Presented). The device of claim 39 wherein the processor is further configured to determine the position of the pointer as the pointer moves with respect to the touch sensitive region.

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66 (Previously Presented). The method of claim 1 wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes.

67 (Previously Presented). The device of claim 39 wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes.

68 (Previously Presented). The device of claim 51 wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes.

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REMARKS

This is a Supplemental Response filed under 37 C.F.R. § 1.111(a)(2). No new matter is added by this Response.

The foregoing amendments simply correct informalities and improve consistency between the claims. The amendments therefore place the claims in better condition for allowance and/or appeal.

No official fee is believed to be due in connection with this Response, other than the fees for the additional claims that are addressed elsewhere in this submittal. If, however, any time extension or additional fee is required to consider this response or to otherwise prevent abandonment of this application, please consider this as a request for an extension of time and as authorization to charge Deposit Account No. 50-2091 for any fees that may be due.

Should the Examiner have any questions or suggestions that would place the Application in better form, Applicant's counsel would welcome a telephone call at (480) 385-5060.

Respectfully submitted,

INGRASSIA, FISHER & LORENZ P.C.

Dated: May 3, 2010

By: /BRETT A. CARLSON/
Brett A. Carlson
Reg. No. 39,928
bcarlson@ifllaw.com

Ingrassia, Fisher & Lorenz PC
Customer No. 69,819
480-385-5060

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Electronic Acknowledgement Receipt

EFS ID:	7533568
Application Number:	11274999
International Application Number:	
Confirmation Number:	7508
Title of Invention:	Methods and systems for detecting a position-based attribute of an object using digital codes
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Customer Number:	69819
Filer:	Brett Carlson/Missy Burbank
Filer Authorized By:	Brett Carlson
Attorney Docket Number:	028.0013
Receipt Date:	03-MAY-2010
Filing Date:	15-NOV-2005
Time Stamp:	14:17:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20100503_SupplementalResponse.pdf	164945 62662a31d33bc5b7b68f9e28d298850b7931bbe9	yes	12

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Supplemental Response or Supplemental Amendment	1	1
	Claims	2	11
	Applicant Arguments/Remarks Made in an Amendment	12	12
Warnings:			
Information:			
	Total Files Size (in bytes):	164945	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/274,999	11/15/2005	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 05/03/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 68	Minus	** 68	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/ANNIE c. SINGLETON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/274,999	11/15/2005	J. Kurth Reynolds	028.0013	7508

69819 7590 07/13/2010

INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

EXAMINER	
MCCOMMAS, STUART S	
ART UNIT	PAPER NUMBER
2629	

NOTIFICATION DATE	DELIVERY MODE
07/13/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@ifllaw.com

Office Action Summary	Application No.	Applicant(s)	
	11/274,999	REYNOLDS, J. KURTH	
	Examiner	Art Unit	
	Stuart McCommas	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 May 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-68* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-68* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3-8, 11-19, 21-22, 33-40, 46, and 48-56, 58-63 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie et al. (United States Patent 5,880,411), hereinafter referenced as Gillespie, in view of Umeda et al. (United States Patent Application Publication 2005/0073324), hereinafter referenced as Umeda.

Regarding claim 1, Gillespie discloses a method of detecting a position of a pointer with respect to a touch-sensitive region comprising a plurality of electrodes (figures 1-5), the method comprising the steps of:

applying a plurality of modulation signals to an associated at least one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the pointer (column 4 lines 45-67; column 5 lines 1-11; column 6 lines 15-45; column 11 lines 65-67; column 12 lines 1-63; figures 1-5);

interpreting the resultant signal to thereby discriminate electrical effects produced by the pointer (column 6 lines 15-45; column 13 lines 35-61; column 14 lines 40-65; figures 1-5);

determining the position of the pointer with respect to the plurality of electrodes from the electrical effects (column 6 lines 15-45; column 14 lines 40-65; figures 1-5).

However Gillespie fails to disclose that the plurality of modulation signals are based on a plurality of distinct digital codes, and demodulating the resultant signal using the plurality of distinct digital codes.

In a similar field of invention Umeda discloses using a plurality of modulation signals based on a plurality of distinct digital codes (paragraphs 19-20; paragraphs 88-99; paragraphs 112-125; paragraphs 131-144; paragraphs 164-175; figures 1-1), and demodulating the resultant signal using the plurality of distinct digital codes (paragraphs 131-144; paragraphs 164-175; figures 1-10).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie with Umeda by specifically providing that the plurality of modulation signals are based on a plurality of distinct digital codes, and demodulating the resultant signal using the plurality of distinct digital codes for the purpose of precisely calculating the position of the finger on the touch sensitive area.

Regarding claim 3, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses determining the position of the pointer with respect to the plurality of electrodes based upon a computed centroid of the electrical effects (column 13 lines 19-27; figures 1-5).

Regarding claim 4, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the determining step comprises

determining a difference between the electrical effects associated with at least two electrodes (paragraphs 18-20; paragraphs 112-124; figures 1-10).

Regarding claim 5, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects (column 22 lines 53-67; column 23 lines 1-34).

Regarding claim 6, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the position-based attribute corresponds to a position of the object with respect to the plurality of electrodes (column 9 lines 3-35; figure 1).

Regarding claim 7, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the position-based attribute describes a motion of the object with respect to the plurality of electrodes (column 44 lines 49-54; figure 1; figure 17D).

Regarding claim 8, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the position-based attribute describes a change in position from a previous position (column 27 lines 24-55; figure 1).

Regarding claim 11, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein each of the plurality of distinct digital codes are substantially orthogonal to the remainder of the plurality of distinct digital codes (paragraphs 18-20; paragraphs 25-28; figures 1-10).

Regarding claim 12, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein each of the plurality of distinct digital codes is a substantial portion of a code derived from a maximum length shift register sequence or M sequence (paragraphs 18-20; paragraphs 25-28; paragraphs 104-109; paragraphs 143-145; figures 1-10).

Regarding claim 13, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein at least some of the plurality of distinct digital codes are selected to avoid the effects of noise in the resultant signal (paragraphs 18-20; paragraphs 25-28; paragraphs 143-145; figures 1-10).

Regarding claim 14, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses generating each of the plurality of distinct digital codes (paragraphs 18-20; paragraphs 25-28; paragraphs 103-104; paragraphs 143-145; figures 1-10).

Regarding claim 15, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses producing the plurality of distinct digital codes using at least one shift register (paragraphs 25-28; paragraphs 103-109; paragraphs 143-145; figures 1-10).

Regarding claim 16, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the applying step comprises applying modulation signals substantially simultaneously to at least two of the plurality of electrodes (paragraphs 103-109; figures 1-10).

Regarding claim 17, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the demodulating step comprises receiving signals from at least two of the plurality of electrodes on a common signal path as the resultant signal (paragraphs 103-119; paragraphs 127-137; figures 1-10).

Regarding claim 18, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses the pointer (figure 1) and Umeda discloses wherein the electrical effects result from an electrical coupling between the object and at least some of the associated electrodes (paragraph 4-7; figures 1-10).

Regarding claim 19, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the electrical coupling is a capacitive coupling (paragraphs 4-7; paragraph 13; figures 1-10).

Regarding claim 21, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses applying a plurality of each of the complementary modulation signals to at least one of the associated first one of the plurality of electrodes and the associated second one of the plurality of electrodes to obtain to obtain a plurality of complementary sensed signals, the plurality of complementary modulation signals based on complements of the plurality of distinct digital codes (paragraphs 112-125; figures 1-10).

Regarding claim 22, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses demodulating each of the plurality of complementary sensed signals using the distinct digital code associated with the at least one of the associated first one of the plurality of electrodes and the associated

second one of the plurality of electrodes to thereby identify complementary electrical effects from the plurality of electrodes, and comparing the electrical effects with the complementary electrical effects to thereby perform dual differential conversion (paragraphs 112-144; figures 1-10).

Regarding claim 33, Gillespie and Umeda, the combiantion discloses everything as applied above, further Umeda discloses wherein the distinct digital codes have more than two states depending on the digital code that is generated (paragraphs 25-28; paragraphs 103-109; paragraphs 143-145; figures 1-10).

Regarding claim 34, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the applying comprises amplitude modulating a carrier signal which is a DC carrier signal with each of the plurality of distinct digital codes (paragraphs 18-20; paragraphs 104-108; figures 1-10).

Regarding claim 35, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the plurality of electrodes comprises a first plurality of electrodes having a first orientation and a second plurality of electrodes having a second orientation (figures 1-4).

Regarding claim 36, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein each of the plurality of distinct modulation signals is applied to the first plurality of electrodes and received via the second plurality of electrodes (figures 1-4).

Regarding claim 37, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses applying a guard signal to at least one inactive electrode of the second plurality of electrodes (paragraphs 99-107; paragraphs 112-120; figures 1-10).

Regarding claim 38, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the applying step comprises applying a same one of the plurality of distinct modulation signals to at least two of the plurality of electrodes (paragraphs 107-109; figures 1-10).

Regarding claim 39, Gillespie discloses a touch-sensitive device for detecting a position of a pointer (figure 1), the device comprising:

a touch-sensitive region comprising a plurality of electrodes having electrical characteristics configured to be affected by the proximity of the pointer (column 4 lines 45-67; column 5 lines 1-11; column 6 lines 15-45; column 11 lines 65-67; column 12 lines 1-63; figures 1-5);

circuitry associated with each of the electrodes (figures 1-5);

a processor coupled to the circuitry, wherein the processor is configured to initiate production of a plurality of distinct modulation signals, to initiate application of each of the plurality of distinct modulation signals to the plurality of electrodes via the circuitry, to interpret a sensed signal received from the touch-sensitive region produced by the pointer, and to determine the position of the pointer with respect to the plurality of

electrodes using the electrical effects (column 6 lines 15-45; column 13 lines 35-61; column 14 lines 40-65; figures 1-5).

However Gillespie fails to disclose a demodulator coupled to the touch-sensitive region, and a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of distinct modulation signals as a function of a plurality of distinct digital codes, to initiate application of each of the plurality of distinct modulation signals to the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the distinct digital codes to discriminate electrical effects produced by the object upon at least one electrode, and to determine the position-based attribute of the object with respect to the plurality of electrodes using the electrical effects.

In a similar field of invention Umeda discloses a demodulator coupled to the touch-sensitive region, and a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of distinct modulation signals as a function of a plurality of distinct digital codes, to initiate application of each of the plurality of distinct modulation signals to the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the distinct digital codes to discriminate electrical effects produced by the object upon at least one electrode, and to determine the position-based attribute of the object with respect to the plurality of electrodes using the electrical effects (paragraphs 19-20; paragraphs 88-99; paragraphs 112-125; paragraphs 131-144; figures 1-10).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie with Umeda by specifically providing a demodulator coupled to the touch-sensitive region, and a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of distinct modulation signals as a function of a plurality of distinct digital codes, to initiate application of each of the plurality of distinct modulation signals to the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the distinct digital codes to discriminate electrical effects produced by the object upon at least one electrode, and to determine the position-based attribute of the object with respect to the plurality of electrodes using the electrical effects for the purpose of precisely calculating the position of the finger on the touch sensitive area.

Regarding claim 40, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses wherein the circuitry comprises an analog signal generator configured to generate a carrier signal and a modulator configured to amplitude modulate the carrier signal with each of the plurality of distinct digital codes to thereby produce the distinct modulation signals (paragraphs 18-20; paragraphs 104-108; figures 1-10).

Regarding claim 46, Gillespie and Umeda, the combination discloses everything as applied above, further Umeda discloses a capacitor electrically coupled to at least some of the plurality of electrodes and to the demodulator (figures 1-5).

Regarding claim 48, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses the pointer is a finger (figure 1).

Regarding claim 49, Gillspie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the object is a stylus (column 4 lines 42-46).

Regarding claim 50, Gillespie and Umeda, the combiantion discloses everything as applied above, further Gillespie discloses wherein the electrodes are formed on a flexible substrate (column 9 lines 36-44).

Regarding claim 51, claim 51 discloses an apparatus and claim 1 describes a method for implementing that apparatus. Thus claim 51 is interpreted and thus rejected for the reasons set forth above in the rejection of claim 1. Thus claim 51 is rejected.

Regarding claim 52, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses determining the position of the pointer as the pointer moves with respect to the touch sensitive region (column 9 lines 3-35; figure 1).

Regarding claim 53, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the resultant signal is directly affected by the position of the pointer (column 9 lines 3-35; figure 1).

Regarding claim 54, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses the pointer is a finger (figure 1).

Regarding claim 55, Gillspie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the object is a stylus (column 4 lines 42-46).

Regarding claim 56, Gillspie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the electrodes are substantially rigidly fixed in position with respect to each other (column 4 lines 42-46).

Regarding claim 58, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the resultant signal is directly affected by the position of the pointer (column 9 lines 3-35; figure 1).

Regarding claim 59, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses the pointer is a finger (figure 1).

Regarding claim 60, Gillspie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the object is a stylus (column 4 lines 42-46).

Regarding claim 61, Gillspie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the electrodes are substantially rigidly fixed in position with respect to each other (column 4 lines 42-46).

Regarding claim 62, Gillspie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the electrodes are substantially rigidly fixed in position with respect to each other (column 4 lines 42-46).

Regarding claim 63, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses wherein the resultant signal is directly affected by the position of the pointer (column 9 lines 3-35; figure 1).

Regarding claim 65, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses the processor is configured for determining the position of the pointer as the pointer moves with respect to the touch sensitive region (column 9 lines 3-35; figure 1).

3. Claims 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gillepie in view of Umeda and further in view of Hirano et al. (United States Patent 5,790,106), hereinafter referenced as Hirano.

Regarding claim 2, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose determining the position of the pointer with respect to the plurality of electrodes based upon a peak value of the electrical effects.

In a similar field of invention Hirano discloses determining the position of the pointer with respect to the plurality of electrodes based upon a peak value of the electrical effects (column 10 lines 26-65; figure 1; figure 8; figure 10).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Hirano by specifically providing determining the position of the pointer with respect to the plurality of electrodes based upon a peak value of the electrical effects for the purpose of precisely calculating the position of the pointing device on the touch pad.

3. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda and further in view of Zadesky et al. (United States Patent Application Publication 2003/0076306), hereinafter referenced as Zadesky.

Regarding claim 9, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose providing an output based upon the position wherein the position-based attribute describes a velocity of the pointer.

In a similar field of invention Zadesky discloses providing an output based upon the position wherein the position-based attribute describes a velocity of the pointer (paragraph 41).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Zadesky by specifically providing an output based upon the position wherein the position-based attribute describes a velocity of the pointer for the purpose of precisely calculating the position of the finger on the touch sensitive area as it is moved across the touch sensitive area.

Regarding claim 10, Gillespie and Umeda, the combinatin discloses everything as applied above, however the combination fails to disclose an output based upon the position wherein the position-based attribute describes a acceleration of the pointer.

In a similar field of invention Zadesky discloses an output based upon the position wherein the position-based attribute describes an acceleration of the pointer (paragraph 41).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Zadesky by specifically providing an output based upon the position wherein the position-based attribute describes an acceleration of the pointer for the purpose of precisely identifying input from a user.

4. Claims 20 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda in view of Iwasaki et al. (United States Patent 6,621,487), hereinafter referenced as Iwasaki.

Regarding claim 20, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose wherein the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes.

In a similar field of invention Iwasaki discloses wherein the resultant signal is received as electrical effects obtained from an integrating capacitor Cs coupled to at least two of the plurality of electrodes (column 6 lines 54-67; column 7 lines 1-17; figures 1-2).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Iwasaki by specifically providing wherein the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes for the purpose of precisely identifying input from a user.

Regarding claim 47, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes.

In a similar field of invention Iwasaki discloses wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes (column 6 lines 54-67; column 7 lines 1-17; figures 1-2).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Iwasaki by specifically providing wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes for the purpose of precisely identifying input from a user.

5. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda in view of Ozluturk et al. (United States Patent 7,106,720), hereinafter referenced as Ozluturk.

Regarding claim 23, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose adjusting at least one of the distinct digital codes in response to the resultant signals.

In a similar field of invention Ozluturk discloses adjusting at least one of the distinct digital codes in response to the resultant signals (column 5 lines 23-67; column 6 lines 1-12; figures 3-4).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Ozluturk by specifically providing adjusting at least one of the distinct digital codes in response to the resultant signals for the purpose of adjusting signals based on the channel conditions to improve the performance of receiving and demodulating signals to speed up the system (column 4 lines 24-34).

Regarding claim 24, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose adjusting at least one of the distinct modulation signals in response to the resultant sensed signals.

In a similar field of invention Ozluturk discloses adjusting at least one of the distinct modulation signals in response to the resultant sensed signals when the code is adjusted (column 5 lines 23-67; column 6 lines 1-12; figures 3-4).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Ozluturk by specifically providing adjusting at least one of the distinct modulation signals in response to the resultant sensed signals for the purpose of adjusting signals based on the channel conditions to improve the performance of receiving and demodulating signals to speed up the system (column 4 lines 24-34).

6. Claims 25-27 and 57 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda in view of Bisset et al. (United States Patent 5,825,352), hereinafter referenced as Bisset.

Regarding claim 25, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose processing the resultant signal to determine a second position of a second pointer in proximity to the touch-sensitive region that is independent of the pointer.

In a similar field of invention Bisset discloses processing the resultant signal to determine a second position of a second pointer in proximity to the touch-sensitive region that is independent of the pointer (column 5 lines 6-60; figures 1-9).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Bisset by specifically providing processing the resultant signal to determine a second position of a second pointer in proximity to the touch-sensitive region that is independent of the pointer for the purpose of allowing multiple fingers to be used on a touch pad to input information quickly.

Regarding claim 26, Gillespie, Umeda and Bisset, the combination discloses everything as applied above, further Bisset discloses wherein the pointer and the second pointerare separate parts of a human hand (column 5 lines 6-60; figures 1-9).

Regarding claim 27, Umeda and Bisset, the combination discloses everything as applied above, further Bisset discloses rejecting information relating to the second pointer when the second pointer's peak value is not above the threshold value necessary for a finger to be considered present (column 5 lines 6-60; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

Regarding claim 57, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose determining a second position of an independent second pointer in proximity to the touch-sensitive region wherein the second position is determined from the electrical effects.

In a similar field of invention Bisset discloses determining a second position of an independent second pointer in proximity to the touch-sensitive region wherein the second position is determined from the electrical effects (column 5 lines 6-60; figures 1-9).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Bisset by specifically providing determining a second position of an independent second pointer in proximity to the touch-sensitive region wherein the second position is determined from the electrical effects for the purpose of allowing multiple fingers to be used on a touch pad to input information quickly.

Regarding claim 64, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose determining a second position of an independent second pointer in proximity to the touch-sensitive region wherein the second position is determined from the electrical effects.

In a similar field of invention Bisset discloses determining a second position of an independent second pointer in proximity to the touch-sensitive region wherein the second position is determined from the electrical effects (column 5 lines 6-60; figures 1-9).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Bisset by specifically providing determining a second position of an independent second pointer in proximity to the touch-sensitive region wherein the second position is determined from the electrical effects for the purpose of allowing multiple fingers to be used on a touch pad to input information quickly.

7. Claims 28-29, and 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda and further in view of Benkley III (United States Patent Application Publication 2004/0081339), hereinafter referenced as Benkley.

Regarding claim 28, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses a pointer (figure 1), however the combination fails to disclose wherein the determining step comprises defining an image.

In a similar field of invention Benkley discloses wherein the determining step comprises defining an image of the object (paragraphs 53-54).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Benkley by specifically providing wherein the determining step comprises defining an image of the object for the purpose of precisely calculating the position of the finger on the touch sensitive area as it is moved across the touch sensitive area (paragraphs 53-54).

Regarding claim 29, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses a pointer (figure 1), however the

combination fails to disclose wherein the image represents a two- dimensional topography of the object projected upon the touch-sensitive region.

In a similar field of invention Benkley discloses wherein the image represents a two-dimensional topography of the object projected upon the touch-sensitive region (paragraphs 53-54).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Benkley by specifically providing wherein the image represents a two- dimensional topography of the object projected upon the touch-sensitive region for the purpose of precisely calculating the position of the finger on the touch sensitive area as it is moved across the touch sensitive area (paragraphs 53-54).

Regarding claim 44, Gillespie and Umeda, the combination discloses everything as applied above, further Gillespie discloses the pointer (figure 1), however the combination fails to disclose wherein presence of the object to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes.

In a similar field of invention Benkley discloses wherein presence of the object to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes (paragraphs 60-64; figures 2A-2B).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Benkley by specifically providing wherein presence of the object to the touch-sensitive region reduces electrical

coupling between at least two of the plurality of electrodes for the purpose of precisely calculating the finger print for precise biometric identification (paragraphs 53-54).

Regarding claim 45, Gillespie, Umeda and Benkley, the combination discloses everything as applied above, further Umeda discloses wherein the at least two of the plurality of electrodes comprise a first electrode having a first orientation and a second electrode having a second orientation substantially perpendicular to the first orientation (figures 1-4).

8. Claims 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda in view of Benkley and further in view of Bisset.

Regarding claim 30, Gillespie and Umeda and Benkley, the combination discloses everything as applied above, however the combination fails to disclose processing the resultant signal to determine a position of a second pointer in proximity to the touch- sensitive region, the second pointer being independent of the pointer and having a second image.

In a similar field of invention Bisset discloses processing the resultant signal to determine a position of a second pointer in proximity to the touch- sensitive region, the second pointer being independent of the pointer and having a second image (column 5 lines 6-60; column 7 lines 1-34; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda and Benkley with Bisset by specifically providing processing the resultant signal to determine a position of a second

pointer in proximity to the touch- sensitive region, the second pointer being independent of the pointer and having a second image for the purpose of allowing multiple fingers to be used on a touch pad to input information quickly.

Regarding claim 31, Gillespie, Umeda, Benkley and Bisset, the combination discloses everything as applied above, further Bisset discloses tracking movements of the pointer and of the second pointer with respect to the touch-sensitive region (column 5 lines 6-60; column 7 lines 1-34; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

Regarding claim 32, Gillespie, Umeda, Benkley and Bisset, the combination discloses everything as applied above, further Bisset discloses determining whether the second pointer represents an undesired input, and if so, rejecting the second pointer if the peak input is below a threshold(column 5 lines 6-60; column 7 lines 1-34; column 8 lines 46-67; column 9 lines 1-37; column 10 lines 31-51; figures 1-9).

9. Claims 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda in view of Yoshikawa et al. (United States Patent Application Publication 2003/0067449), hereinafter referenced as Yoshikawa.

Regarding claim 41, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user.

In a similar field of invention Yoshikawa discloses wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user (paragraph 8; paragraphs 83-90; figures 1-2).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Yoshikawa by specifically providing wherein the touch-sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user for the purpose of providing feedback to a user to let the use know that input is being received (paragraphs 6-7; paragraph 25).

Regarding claim 42, Gillespie and Umeda and Yoshikawa, the combination discloses everything as applied above, further Yoshikawa discloses wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the electrical effects (paragraphs 24-33; paragraphs 81-90; figures 1-8).

Regarding claim 43, Gillespie and Umeda and Yoshikawa, the combination discloses everything as applied above, further Yoshikawa discloses wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the positions of the plurality of electrodes relative to each other (paragraphs 24-33; paragraphs 81-90; figures 1-8).

10. Claims 66-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gillespie in view of Umeda in view of Moerder (United States Patent Application Publication 2003/00133432), hereinafter referenced as Moerder.

Regarding claim 66, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes.

In a similar field of invention Moerder discloses wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes (paragraph 44).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Moerder by specifically providing wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes for the purpose of improving the performance of the device.

Regarding claim 67, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes.

In a similar field of invention Moerder discloses wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes (paragraph 44).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Moerder by specifically providing wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes for the purpose of improving the performance of the device.

Regarding claim 68, Gillespie and Umeda, the combination discloses everything as applied above, however the combination fails to disclose wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes.

In a similar field of invention Moerder discloses wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes (paragraph 44).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gillespie and Umeda with Moerder by specifically providing wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes for the purpose of improving the performance of the device.

Response to Arguments

11. Applicant's arguments with respect to claims 1-68 have been considered but are moot in view of the new ground(s) of rejection.

On pages 12-13, Applicant argues that Umeda fails to disclose using a plurality of distinct codes.

The Examiner respectfully disagrees, because Umeda discloses this feature in paragraphs 163-168, where Umeda discloses using a plurality of distinct digital codes in the device.

On pages 13-14, Applicant argues that the Umeda/Gillespie combination is not an obvious combination because the combination would degrade the output signal and decrease the sensing power of the device.

The Examiner respectfully disagrees, because the techniques described in Umeda are known techniques for detecting signals in electrically noisy environments. Thus one of ordinary skill would contemplate combining the references to improve the signal detection to improve the performance of the display. Further Umeda discloses

that the use of codes eliminates cross talk in paragraph 20, which is a valid motivation for combining the two references.

Conclusion

5. Applicant's amendments necessitated the new ground(s) of rejection presented in this action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stuart McCommas whose telephone number is (571)270-3568. The examiner can normally be reached on Monday-Friday 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alex Eisen can be reached on 571-272-7687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Stuart McCommas
Patent Examiner
Art Unit 2629

SSM

/Alexander Eisen/

Supervisory Patent Examiner, Art Unit 2629

Notice of References Cited	Application/Control No. 11/274,999	Applicant(s)/Patent Under Reexamination REYNOLDS, J. KURTH	
	Examiner Stuart McCommas	Art Unit 2629	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2003/0133432	07-2003	Moerder, Karl E.	370/342
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	"20030230680"	US-PGPUB; USPAT; USOCR	ADJ	ON	2010/06/25 20:12
L2	1	(10/173685).APP.	USPAT; USOCR	ADJ	ON	2010/06/25 20:13
L3	38	("5157381" | "5340067" | "5404591" | "5414445" | "5490647" | "5570112" | "5576733" | "5581277" | "5648798" | "5826842" | "5845884" | "5870081" | "5913497" | "5944289" | "5990871" | "6005553" | "6064371" | "6097371" | "6157370" | "6300941" | "6304249" | "6362811" | "6377245" | "6396478" | "6431504" | "6433779" | "6486868" | "6489947" | "D374867" | "D384047").PN. OR ("6921054").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2010/06/25 20:13
S1	19	US-4170025-$.DID. OR US-4459541-$.DID. OR US-5305017-$.DID. OR US-5666113-$.DID. OR US-5790106-$.DID. OR US-5825352-$.DID. OR US-5861875-$.DID. OR US-5917906-$.DID. OR US-6570557-$.DID. OR US-6704005-$.DID. OR US-6771280-$.DID. OR US-6788288-$.DID. OR US-20030030628-$.DID. OR US-20030035570-$.DID. OR US-20040081339-$.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:04

		DID. OR US-20050005703-$.DID. OR US-20050024065-$.DID. OR US-20050052425-$.DID. OR US-20050073324-$.DID.				
S2	2	US-20020049070-$.DID. OR US-20050122785-$.DID.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:05
S3	1289	345/173.ccls. and capacitive	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:16
S4	1	"5880411".pn.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:18
S5	18	345/173.ccls. and capacitive and spread spectrum	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:21
S6	1	345/173.ccls. and capacitive and change code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:30
S7	35	345/173.ccls. and capacitive and digital code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:32
S8	1	345/173.ccls. and capacitive and digital code and modulation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:32
S9	1	345/173.ccls. and capacitive and digital code and modulate	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:32
S10	35	345/173.ccls. and capacitive and digital code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:32
S11	70	345/173.ccls. and capacitive and modulate	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 13:33

S12	17	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/01/12 16:40
S13	3	S12 and centroid	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:40
S14	2	S12 and baseline	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:42
S15	6	S12 and change with position	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:43
S16	0	S12 and velocity with position	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:44
S17	4	S12 and velocity	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:44
S18	6	S12 and change with position	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:45
S19	12	S12 and speed	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:45
S20	1	S12 and acceleration	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:55
S21	0	345/173.ccls. and capacitivie and acceleration	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:56
S22	195	345/173.ccls. and capacitive and acceleration	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:56

S23	6	345/173.ccls. and capacitive and (acceleration with detect)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:56
S24	71	345/173.ccls. and capacitive and (acceleration with finger)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 16:59
S25	0	"20050073324" and orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:00
S26	2	"20050073324"	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:01
S27	0	"20050073324" and ortho	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:31
S28	0	"20050073324" and orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:32
S29	693	345/173.ccls. and orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:32
S30	324	345/173.ccls. and orthogonal and capacitive	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:32
S31	9	345/173.ccls. and orthogonal with code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:32
S32	0	"20050073324" and correlation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:34
S33	2	"20050073324" and cross	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:35
S34	2	"20050073324" and noise	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:38
S35	0	"20050073324" and integrating	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:42
S36	2	S12 and integrating	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:42
S37	0	S12 and integrating capacitor	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:42

S38	31	345/173.ccls. and integrating capacitor	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/12 17:43
S39	19	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$ or US-20030076306-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$ or US-6621487-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/01/13 12:06
S40	6	S39 and code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:06
S41	1339	345/173.ccls. and code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:13
S42	112	345/173.ccls. and code with (sensed or detected or adjust)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:13
S43	8	("3819857" | "4126760" | "5210380" | "5416280").PN. OR ("5952999").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:16
S44	0	code generation with channel conditions	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:20
S45	0	code generation with channel]	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:20
S46	275	code generation with channel	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:20
S47	0	"345.173,ccks", and code generation with channel	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:34

S48	0	"345.173,ccks", and code generation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:34
S49	0	"345.173,ccls." and code generation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:34
S50	6	345/173.ccls. and code generation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:35
S51	0	(11/274999).APP.	USPAT; USOCR	ADJ	ON	2009/01/13 12:36
S52	0	adjust code with reciever	USPAT; USOCR	ADJ	ON	2009/01/13 12:37
S53	0	adjusting code with reciever	USPAT; USOCR	ADJ	ON	2009/01/13 12:37
S54	1974	walsh code	USPAT; USOCR	ADJ	ON	2009/01/13 12:37
S55	17	walsh code with adjust	USPAT; USOCR	ADJ	ON	2009/01/13 12:37
S56	4005	code with adjust	USPAT; USOCR	ADJ	ON	2009/01/13 12:40
S57	33802	code with change	USPAT; USOCR	ADJ	ON	2009/01/13 12:40
S58	65426	(adjust or change) with code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:43
S59	112	"345".clss. and (adjust or change) with code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 12:44
S60	23	("20010006006" | "20030066692" | "20030164820" | "20030217873" | "4317227" | "5059959" | "5194852" | "5404458" | "5412189" | "5628031" | "5638093" | "5691959" | "5717432" | "5856820" | "5986224" | "6161434" | "6167165" | "6404353" | "6549193" | "6555235" | "6724373" | "6738051" | "6891527").PN. OR ("7345677").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:35

S61	1409	(update with code) and cdma	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:37
S62	134	(update code) and cdma	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:37
S63	24	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$ or US-20030076306-$ or US-20020008692-$ or US-20040136445-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$ or US-6621487-$ or US-3605019-$ or US-5204876-$ or US-7106720-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/01/13 14:44
S64	16	S63 and hand and finger	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:44
S65	1	S63 and hand and finger and reject	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:46
S66	2	S63 and fingerprint and image	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 14:49

S67	24	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$ or US-20030076306-$ or US-20020008692-$ or US-20040136445-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$ or US-6621487-$ or US-3605019-$ or US-5204876-$ or US-7106720-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/01/13 15:01
S68	0	S67 and amplitude modulating	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:01
S69	2	S67 and amplitude modulation	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:01
S70	0	S67 and guard signal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:02
S71	1	S67 and ground signal	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:06
S72	13	S67 and ground	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:06
S73	1	S67 and (ground with row)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:10
S74	1	S67 and tactile feedback	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:14
S75	265	345/173.ccls. and tactile feedback	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:14

S76	152	345/173.ccls. and tactile feedback and capacitive	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:14
S77	14	S67 and (stylus or pen)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:19
S78	9	S67 and (flexible or bend)	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/01/13 15:20
S79	25	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$ or US-20030076306-$ or US-20020008692-$ or US-20040136445-$ or US-20030067449-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$ or US-6621487-$ or US-3605019-$ or US-5204876-$ or US-7106720-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/12/15 13:11
S80	13	S79 and peak	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/12/15 13:12
S81	2	345/173.ccls. and capacitive and digital code and modulate	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/12/18 15:49
S82	46	345/173.ccls. and capacitive and digital code	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/12/18 15:49
S83	95	345/173.ccls. and capacitive and modulate	US-PGPUB; USPAT; USOCR	ADJ	ON	2010/06/24 16:26

S84	25	(US-20020036621-$ or US-20020050983-$ or US-20040056849-$ or US-20050052429-$ or US-20050146513-$ or US-20050104861-$ or US-20040081339-$ or US-20050005703-$ or US-20050073324-$ or US-20050024065-$ or US-20030076306-$ or US-20020008692-$ or US-20040136445-$ or US-20030067449-$). did. or (US-5880411-$ or US-7084860-$ or US-7411584-$ or US-5825352-$ or US-5861875-$ or US-5790106-$ or US-6570557-$ or US-6621487-$ or US-3605019-$ or US-5204876-$ or US-7106720-$).did.	US-PGPUB; USPAT	ADJ	ON	2010/06/24 16:26
S85	0	S84 and strictly orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2010/06/24 16:27
S86	10	S84 and orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2010/06/24 16:27
S87	0	"20050073324" and orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2010/06/24 16:28
S88	16	code with strictly orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2010/06/24 16:31
S89	2052	walsh code with orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2010/06/24 16:34
S90	0	walsh code with stricly orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2010/06/24 16:34
S91	0	walsh code with strictly orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2010/06/24 16:34
S92	4	walsh code with completely orthogonal	US-PGPUB; USPAT; USOCR	ADJ	ON	2010/06/24 16:34

6/25/2010 8:21:26 PM
C:\Documents and Settings\smccommas\My Documents\EAST\Workspaces\11274999touchsensor.wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Stuart McCommas	2629

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/15/2009	07/10/2009	12/18/2009	06/24/2010					
	1	✓	✓	✓	✓					
	2	✓	✓	✓	✓					
	3	✓	✓	✓	✓					
	4	✓	✓	✓	✓					
	5	✓	✓	✓	✓					
	6	✓	✓	✓	✓					
	7	✓	✓	✓	✓					
	8	✓	✓	✓	✓					
	9	✓	✓	✓	✓					
	10	✓	✓	✓	✓					
	11	✓	✓	✓	✓					
	12	✓	✓	✓	✓					
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	32	✓	✓	✓	✓					
	33	✓	✓	✓	✓					
	34	✓	✓	✓	✓					
	35	✓	✓	✓	✓					
	36	✓	✓	✓	✓					

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Stuart McCommas	2629

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/15/2009	07/10/2009	12/18/2009	06/24/2010					
	37	✓	✓	✓	✓					
	38	✓	✓	✓	✓					
	39	✓	✓	✓	✓					
	40	✓	✓	✓	✓					
	41	✓	✓	✓	✓					
	42	✓	✓	✓	✓					
	43	✓	✓	✓	✓					
	44	✓	✓	✓	✓					
	45	✓	✓	✓	✓					
	46	✓	✓	✓	✓					
	47	✓	✓	✓	✓					
	48	✓	✓	✓	✓					
	49	✓	✓	✓	✓					
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	51	✓	✓	✓	✓					
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	63			✓	✓					
	64			✓	✓					
	65			✓	✓					
	66				✓					
	67				✓					
	68				✓					

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Stuart McCommas	2629

SEARCHED			
Class	Subclass	Date	Examiner
345	173	1/15/2009	SSM

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Search Attached	1/15/2009	SSM
EAST Search Updated	7/10/2009	SSM
EAST Search Updated	12/18/2009	SSM
EAST Search Updated	6/23/2010	SSM

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	11274999
Filing Date	2005-11-15
First Named Inventor	J. Kurth Reynolds
Art Unit	2629
Examiner Name	Stuart McCommas
Attorney Docket Number	028.0013

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4733222		1998-03-22	Evans	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

447 ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /S.M./ Shenzhen Ruiding Tech. Co., Ltd. - Exhibit 1013

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	11274999
	Filing Date	2005-11-15
	First Named Inventor	J. Kurth Reynolds
	Art Unit	2629
	Examiner Name	Stuart McCommas
	Attorney Docket Number	028.0013

	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/Stuart Mccommas/	Date Considered	06/29/2010

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/274,999	11/15/2005	J. Kurth Reynolds	028.0013	7508

69819 7590 08/23/2010

INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

EXAMINER	
NGUYEN, KEVIN M	
ART UNIT	**PAPER NUMBER**
2629	

NOTIFICATION DATE	DELIVERY MODE
08/23/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@ifllaw.com

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

Interview Summary	Application No.	Applicant(s)	
	11/274,999	REYNOLDS, J. KURTH	
	Examiner	Art Unit	
	Kevin M. Nguyen	2629	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Kevin M. Nguyen*. (3)_____.

(2) *Brett Carlson*. (4)_____.

Date of Interview: *18 August 2010*.

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☒ No.
If Yes, brief description: _____.

Claim(s) discussed: *1-68*.

Identification of prior art discussed: *Gillespie (5,880,411) and Umeda (20050073324)*.

Agreement with respect to the claims f)☒ was reached. g)☐ was not reached. h)☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *discussed that the supplemental amendment to at least independent claims 1, 39 and 5, filed 5/3/2010, that overcome over prior art rejection of the Final Office action mailed 7/13/2010. Await a formal response from the applicant* .

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

/Kevin M Nguyen/ Primary Examiner, Art Unit 2629	

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

———

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	J. Kurth REYNOLDS	Confirmation No.: 7508
Appl. No.	:	11/274,999	
Filed	:	November 15, 2005	
Art Unit	:	2629	
Examiner	:	Kevin M. Nguyen	
Docket No.	:	028.0013	
Title	:	METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES	

REQUEST FOR RECONSIDERATION
FILED UNDER 37 C.F.R. § 1.116

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

In response to the Final Office Action mailed July 13, 2010, please consider the remarks that follow under 37 C.F.R. § 1.116.

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 12 of this paper.

Amendments to the Claims:

Please amend the claims to read as follows:

1. (Previously Presented) A method of detecting a position of a pointer with respect to a touch-sensitive region comprising a plurality of electrodes, the method comprising the steps of:

simultaneously applying a first one of a plurality of distinct modulation signals to an associated first one of the plurality of electrodes and a second one of the plurality of distinct modulation signals to an associated second one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the pointer, wherein each of the plurality of distinct modulation signals is based on a different one of a plurality of distinct digital codes;

demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the pointer; and

determining the position of the pointer with respect to the plurality of electrodes from the electrical effects.

2. (Previously Presented) The method of claim 1 wherein the determining step comprises determining the position of the pointer with respect to the plurality of electrodes based upon a peak value of the electrical effects.

3. (Previously Presented) The method of claim 1 wherein the determining step comprises determining the position of the pointer with respect to the plurality of electrodes based upon a computed centroid of the electrical effects.

4. (Previously Presented) The method of claim 1 wherein the determining step comprises determining a difference between the electrical effects associated with at least two electrodes.

5. (Original) The method of claim 1 wherein the determining step comprises comparing the electrical effects to previously-determined baseline effects.

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6. (Previously Presented) The method of claim 1 wherein determining comprises determining the position of the pointer as the pointer moves with respect to the touch sensitive region.

7. (Previously Presented) The method of claim 1 further comprising providing an output based upon the position that describes a motion of the pointer with respect to the plurality of electrodes.

8. (Previously Presented) The method of claim 1 further comprising providing an output based upon the position that describes a change in the position from a previous position.

9. (Previously Presented) The method of claim 1 further comprising providing an output based upon the position that describes a velocity of the pointer.

10. (Previously Presented) The method of claim 1 further comprising providing an output based upon the position that describes an acceleration of the pointer.

11. (Previously Presented) The method of claim 1 wherein each of the plurality of distinct digital codes is substantially orthogonal to the remainder of the plurality of distinct digital codes.

12. (Previously Presented) The method of claim 1 wherein each of the plurality of distinct digital codes is a substantial portion of a code derived from a maximum length shift register sequence.

13. (Previously Presented) The method of claim 1 wherein at least some of the plurality of distinct digital codes are selected to avoid the effects of noise in the resultant signal.

14. (Original) The method of claim 1 further comprising the step of generating each of the plurality of distinct digital codes.

15. (Original) The method of claim 14 wherein the generating step comprises producing the plurality of distinct digital codes using at least one shift register.

16. (Previously Presented) The method of claim 1 wherein the applying step comprises applying a same one of the plurality of distinct modulation signals substantially simultaneously to at least two of the plurality of electrodes.

17. (Previously Presented) The method of claim 1 wherein the demodulating step comprises receiving signals from at least two of the plurality of electrodes on a common signal path as the resultant signal.

18. (Previously Presented) The method of claim 1 wherein the electrical effects result from an electrical coupling between the pointer and at least some of the associated electrodes.

19. (Original) The method of claim 18 wherein the electrical coupling is a capacitive coupling.

20. (Previously Presented) The method of claim 18 wherein the resultant signal is received as electrical effects obtained from an integrating capacitor coupled to at least two of the plurality of electrodes.

21. (Currently Amended) The method of claim 1 further comprising the ~~steps~~ step of:

applying a plurality of complementary modulation signals to at least one of the associated first one of the plurality of electrodes and the associated second one of the plurality of electrodes to obtain a plurality of complementary sensed signals, the plurality of

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complementary modulation signals based on complements of the plurality of distinct digital codes.

22. (Previously Presented) The method of claim 21 further comprising the steps of:

demodulating each of the plurality of complementary sensed signals using the distinct digital code associated with the at least one of the associated first one of the plurality of electrodes and the associated second one of the plurality of electrodes to thereby identify complementary electrical effects from the plurality of electrodes; and

comparing the electrical effects with the complementary electrical effects to thereby perform dual differential conversion.

23. (Previously Presented) The method of claim 1 further comprising the step of adjusting at least one of the distinct digital codes in response to the resultant signals.

24. (Previously Presented) The method of claim 1 further comprising the step of adjusting at least one of the distinct modulation signals in response to the resultant signal.

25. (Previously Presented) The method of claim 1 further comprising the step of processing the resultant signal to determine a second position of a second pointer in proximity to the touch-sensitive region that is independent of the pointer.

26. (Previously Presented) The method of claim 25 wherein the pointer and the second pointer are separate parts of a human hand.

27. (Previously Presented) The method of claim 25 further comprising the step of rejecting information relating to the second pointer.

28. (Previously Presented) The method of claim 1 wherein the determining step comprises defining an image of the pointer.

29. (Previously Presented) The method of claim 28 wherein the image represents a two-dimensional topography of the pointer projected upon the touch-sensitive region.

30. (Previously Presented) The method of claim 28 further comprising the step of processing the resultant signal to determine a position of a second pointer in proximity to the touch-sensitive region, the second pointer being independent of the pointer and having a second image.

31. (Previously Presented) The method of claim 30 further comprising the step of tracking movements of the pointer and of the second pointer with respect to the touch-sensitive region.

32. (Previously Presented) The method of claim 30 further comprising the step of determining whether the second pointer represents an undesired input, and if so, rejecting the second pointer.

33. (Original) The method of claim 1 wherein the distinct digital codes have more than two states.

34. (Previously Presented) The method of claim 1 wherein the applying step comprises amplitude modulating a carrier signal with each of the plurality of distinct digital codes.

35. (Original) The method of claim 1 wherein the plurality of electrodes comprises a first plurality of electrodes having a first orientation and a second plurality of electrodes having a second orientation.

36. (Previously Presented) The method of claim 35 wherein each of the plurality of distinct modulation signals is applied to the first plurality of electrodes and received via the second plurality of electrodes.

37. (Original) The method of claim 35 further comprising the step of applying a guard signal to at least one inactive electrode of the second plurality of electrodes.

38. (Previously Presented) The method of claim 1 wherein the applying step comprises applying a same one of the plurality of distinct modulation signals to at least two of the plurality of electrodes.

39. (Currently Amended) A touch-sensitive device for detecting a position of a pointer, the device comprising:

a touch-sensitive region comprising a plurality of electrodes having electrical characteristics configured to be affected by the proximity of the pointer;

circuitry associated with each of the electrodes;

a demodulator coupled to the touch-sensitive region; and

a processor coupled to the circuitry and to the demodulator, wherein the processor is configured to initiate production of a plurality of distinct modulation signals, wherein each of the plurality of distinct modulation signals is produced as a function of a different one of a plurality of distinct digital codes, to initiate simultaneous application of a first one of the plurality of distinct modulation signals to a first one of the plurality of electrodes and a second one of the plurality of distinct modulation signals to a second one of the plurality of electrodes via the circuitry, to demodulate a sensed signal received from the touch-sensitive region using the distinct digital codes to discriminate electrical effects produced by the pointer upon at least one electrode, and to determine the position of the pointer with respect to the plurality of electrodes using the electrical effects.

40. (Previously Presented) The device of claim 39 wherein the circuitry comprises an analog signal generator configured to generate a carrier signal and a modulator configured to amplitude modulate the carrier signal with each of the plurality of distinct digital codes to thereby produce the distinct modulation signals.

41. (Original) The device of claim 39 wherein the touch sensitive device further comprises a substantially rigid surface configured to provide tactile feedback to the user.

42. (Original) The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the electrical effects.

43. (Original) The device of claim 41 wherein the substantially rigid surface is further configured to provide the tactile feedback without substantially affecting the positions of the plurality of electrodes relative to each other.

44. (Previously Presented) The device of claim 39 wherein presence of the pointer to the touch-sensitive region reduces electrical coupling between at least two of the plurality of electrodes.

45. (Original) The device of claim 44 wherein the at least two of the plurality of electrodes comprise a first electrode having a first orientation and a second electrode having a second orientation substantially perpendicular to the first orientation.

46. (Original) The device of claim 39 further comprising a capacitor electrically coupled to at least some of the plurality of electrodes and to the demodulator.

47. (Original) The device of claim 46 wherein the capacitor is configured to integrate charge received from the at least some of the plurality of electrodes.

48. (Previously Presented) The device of claim 39 wherein the pointer is a finger.

49. (Previously Presented) The device of claim 39 wherein the pointer is a stylus.

50. (Previously Presented) The device of claim 39 wherein the electrodes are formed on a flexible substrate.

51. (Previously Presented) A device for detecting a position of a pointer with respect to a touch-sensitive region comprising a plurality of electrodes, the device comprising:

means for simultaneously applying a first one of a plurality of distinct modulation signals to an associated first one of the plurality of electrodes and a second one of the plurality of distinct modulation signals to an associated second one of the plurality of electrodes to obtain a resultant signal that is electrically affected by the position of the pointer, wherein each of the plurality of distinct modulation signals is based on a different one of a plurality of distinct digital codes;

means for demodulating the resultant signal using the plurality of distinct digital codes to thereby discriminate electrical effects produced by the pointer; and

means for determining the position of the pointer with respect to the plurality of electrodes from the electrical effects.

52 (Previously Presented). The device of claim 51 wherein the means for determining is configured to determine the position of the pointer as the pointer moves with respect to the touch sensitive region.

53 (Previously Presented). The device of claim 51 wherein the resultant signal is directly affected by the position of the pointer.

54 (Previously Presented). The device of claim 51 wherein the pointer is a finger.

55 (Previously Presented). The device of claim 51 wherein the pointer is a stylus.

56 (Previously Presented). The device of claim 51 wherein the electrodes are substantially rigidly fixed in position with respect to each other.

57 (Previously Presented). The device of claim 51 wherein the determining means is further configured to determine a second position of an independent second pointer that is in proximity to the touch-sensitive region, wherein the second position is determined from the electrical effects.

58 (Previously Presented). The method of claim 1 wherein the resultant signal is directly affected by the position of the pointer.

59 (Previously Presented). The method of claim 1 wherein the pointer is a finger.

60 (Previously Presented). The method of claim 1 wherein the pointer is a stylus.

61 (Previously Presented). The method of claim 1 wherein the electrodes are substantially rigidly fixed in position with respect to each other.

62 (Previously Presented). The device of claim 39 wherein the electrodes are substantially rigidly fixed in position with respect to each other.

63 (Previously Presented). The device of claim 39 wherein the resultant signal is directly affected by the position of the pointer.

64 (Previously Presented). The device of claim 39 wherein the processor is further configured to determine a second position of an independent second pointer that is in proximity to the touch-sensitive region, wherein the second position is determined from the electrical effects.

65 (Previously Presented). The device of claim 39 wherein the processor is further configured to determine the position of the pointer as the pointer moves with respect to the touch sensitive region.

66 (Previously Presented). The method of claim 1 wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes.

67 (Previously Presented). The device of claim 39 wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes.

68 (Previously Presented). The device of claim 51 wherein each of the plurality of distinct digital codes is strictly orthogonal to the other digital codes.

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REMARKS

This is a Response to the Final Office Action dated July 13, 2010 filed under 37 C.F.R. § 1.116. The only amendments to the claims remedy minor linguistic issues in claims 21 and 39. These amendments do not change the scope of the claims and are not made for purposes related to patentability, so they do not affect the scope of legal equivalents that may otherwise be available. No new matter has been added.

We greatly appreciate the courtesy extended by Examiner Nguyen in the telephonic interview with the undersigned on August 18, 2010. During the interview, the Examiner acknowledged that the present claims patentably distinguish over the art of record, and that the Application is now in condition for allowance. This was confirmed in the Interview Summary mailed on August 23, 2010.

In view of the Examiner's acknowledgement that the claims are now allowable, all of the issues identified in the Final Office Action are now moot. We therefore respectfully request that the Office issue a Notice of Allowance at its earliest opportunity.

No official fee is believed to be due in connection with this Response. If, however, any time extension or additional fee is required to consider this response or to otherwise prevent abandonment of this application, please consider this as a request for an extension of time and as authorization to charge Deposit Account No. 50-2091 for any fees that may be due.

We greatly appreciate the Examiner's efforts and assistance in moving this Application to allowance. Should the Examiner have any questions or suggestions that would place the Application in better form, Applicant's counsel would welcome a telephone call at (480) 385-5069.

Respectfully submitted,

INGRASSIA, FISHER & LORENZ P.C.

Dated: August 25, 2010

By: /BRETT A. CARLSON/
Brett A. Carlson
Reg. No. 39,928
bcarlson@ifllaw.com

Ingrassia, Fisher & Lorenz PC
Customer No. 69,819
480-385-5060

Electronic Acknowledgement Receipt

EFS ID:	8285807
Application Number:	11274999
International Application Number:	
Confirmation Number:	7508
Title of Invention:	Methods and systems for detecting a position-based attribute of an object using digital codes
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Customer Number:	69819
Filer:	Brett Carlson
Filer Authorized By:	
Attorney Docket Number:	028.0013
Receipt Date:	25-AUG-2010
Filing Date:	15-NOV-2005
Time Stamp:	14:15:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20100825_Response.pdf	178627 72aa5b5aca05bc547d6bcef243262a03b9c70ffd	yes	12

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment After Final	1	1
	Claims	2	11
	Applicant Arguments/Remarks Made in an Amendment	12	12
Warnings:			
Information:			
	Total Files Size (in bytes):	178627	

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/274,999	11/15/2005	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 08/25/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 68	Minus	** 68	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/MARQUETTA MCGEE/

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NOTICE OF ALLOWANCE AND FEE(S) DUE

69819 7590 09/03/2010

INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

EXAMINER	
NGUYEN, KEVIN M	
ART UNIT	PAPER NUMBER
2629	

DATE MAILED: 09/03/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/274,999	11/15/2005	J. Kurth Reynolds	028.0013	7508

TITLE OF INVENTION: METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	12/03/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

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69819 7590 09/03/2010

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/274,999	11/15/2005	J. Kurth Reynolds	028.0013	7508

TITLE OF INVENTION: METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	12/03/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, KEVIN M	2629	345-173000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

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1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

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(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

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❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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Typed or printed name _____ Registration No. _____

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/274,999	11/15/2005	J. Kurth Reynolds	028.0013	7508

69819 7590 09/03/2010

INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

EXAMINER	
NGUYEN, KEVIN M	
ART UNIT	PAPER NUMBER
2629	

DATE MAILED: 09/03/2010

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 716 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 716 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	11/274,999	REYNOLDS, J. KURTH	
	Examiner	Art Unit	
	Kevin M. Nguyen	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *8/25/2010*.

2. ☒ The allowed claim(s) is/are *1-68*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Kevin M Nguyen/
Primary Examiner, Art Unit 2629

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

REASONS FOR ALLOWANCE

Claims 1-68 are allowed.

The following is an examiner's statement of reasons for allowance:

Claims 1-68 are allowable for the reasons argued by the applicant in the response filed on 4/5/2010.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEVIN M. NGUYEN whose telephone number is (571)272-7697. The examiner can normally be reached on Monday-Thursday from 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on (571)272-7687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kevin M Nguyen/
Primary Examiner, Art Unit 2629

/KMN/
August 31, 2010

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 7508

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/274,999	11/15/2005	345	2629	028.0013

APPLICANTS
J. Kurth Reynolds, Sunnyvale, CA;

**** CONTINUING DATA ***************************

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
12/14/2005

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /KEVIN M NGUYEN/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	5	51	3

ADDRESS

INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253
UNITED STATES

TITLE

Methods and systems for detecting a position-based attribute of an object using digital codes

FILING FEE RECEIVED	FEES: Authority has been given in Paper	☐ All Fees
5786	No._____ to charge/credit DEPOSIT ACCOUNT	☐ 1.16 Fees (Filing)
	No._____ for following:	☐ 1.17 Fees (Processing Ext. of time)
		☐ 1.18 Fees (Issue)
		☐ Other _____
		☐ Credit

Issue Classification

Application/Control No.	Applicant(s)/Patent Under Reexamination
11274999	REYNOLDS, J. KURTH
Examiner	**Art Unit**
Kevin M Nguyen	2629

ORIGINAL		INTERNATIONAL CLASSIFICATION														
CLASS	SUBCLASS	CLAIMED									NON-CLAIMED					
345	173	G	0	6	F	3 / 041 (2006.01.01)										

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
178	19.07				

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17		33		49		65						
	2		18		34		50		66						
	3		19		35		51		67						
	4		20		36		52		68						
	5		21		37		53								
	6		22		38		54								
	7		23		39		55								
	8		24		40		56								
	9		25		41		57								
	10		26		42		58								
	11		27		43		59								
	12		28		44		60								
	13		29		45		61								
	14		30		46		62								
	15		31		47		63								
	16		32		48		64								

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	68	
/Kevin M Nguyen/ Primary Examiner.Art Unit 2629	08/26/2010	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	4

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Kevin Nguyen	2629

SEARCHED			
Class	Subclass	Date	Examiner
345	173	1/15/2009	KMN

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Search Attached	1/15/2009	KMN
EAST Search Updated	7/10/2009	KMN
EAST Search Updated	12/18/2009	KMN
EAST Search Updated	6/23/2010	KMN

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
345	173	8/26/2010	KMN
178	19.07	8/26/2010	KMN

	/Kevin M Nguyen/ Primary Examiner.Art Unit 2629

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"6798403".pn.	USPAT	OR	OFF	2010/08/18 13:24
S2	2	11/891349	US-PGPUB	OR	OFF	2010/08/18 13:34
S3	2	S2 and wand with transmitters	US-PGPUB	OR	OFF	2010/08/18 13:34
S4	1	"5880411".pn.	USPAT	OR	OFF	2010/08/18 13:58
S5	0	2005/0073324	US-PGPUB	OR	OFF	2010/08/18 13:58
S6	1	"20050073324"	US-PGPUB	OR	OFF	2010/08/18 13:58
S7	59	SYNAPTICS near INCORPORATED	US-PGPUB	OR	OFF	2010/08/18 14:04
S8	93	SYNAPTICS near INCORPORATED	USPAT	OR	OFF	2010/08/18 14:04
S9	4128	345/173.ccls.	US-PGPUB	OR	OFF	2010/08/18 14:07
S10	1	11/274999	US-PGPUB	OR	OFF	2010/08/18 14:07
S11	1	"5880411".pn. and (simultaneous$3)	USPAT	OR	OFF	2010/08/18 14:23
S12	0	10/941605 and (simultaneous$3)	US-PGPUB	OR	OFF	2010/08/18 14:27
S13	1	10/941605 and (simultaneous$3 ("same" adj time))	US-PGPUB	OR	OFF	2010/08/18 14:27

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp

L1	0	(((touch adj screen) touchscreen) and (simultaneous$3 ("same" adj time)) with (differen$3 distinct) with modulat $4 and (binary bits codes)).clm.	US-PGPUB; USPAT; UPAD	OR	OFF	2010/08/26 13:59
L2	0	(((touch adj screen) touchscreen touch-sensitive) and (simultaneous$3 ("same" adj time)) with (differen$3 distinct) with modulat $4 and (binary bits codes)).clm.	US-PGPUB; USPAT; UPAD	OR	OFF	2010/08/26 13:59
L3	6	(((touch adj screen) touchscreen touch-sensitive) and (simultaneous$3 ("same" adj time)) and (differen$3 distinct) and modulat $4 and (binary bits codes)).clm.	US-PGPUB; USPAT; UPAD	OR	OFF	2010/08/26 13:59
L4	4430	345/174-183.ccls.	US-PGPUB; USPAT; UPAD	OR	OFF	2010/08/26 14:00
L5	181	4 and (simultaneous $3 ("same" adj time)) and (differen $3 distinct) and modulat$4 and (binary bits codes)	US-PGPUB; USPAT; UPAD	OR	OFF	2010/08/26 14:01
L6	8	4 and (simultaneous $3 ("same" adj time)) same (differen $3 distinct) same modulat$4 and (binary bits codes)	US-PGPUB; USPAT; UPAD	OR	OFF	2010/08/26 14:01
L7	31	178/19.07.ccls.	US-PGPUB; USPAT; UPAD	OR	OFF	2010/08/26 14:08

8/26/2010 2:18:40 PM
C:\Documents and Settings\knguyen3\My Documents\EAST\Workspaces\11274999.wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Kevin M Nguyen	2629

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/15/2009	07/10/2009	12/18/2009	06/24/2010	08/26/2010				
	1	✓	✓	✓	✓	=				
	2	✓	✓	✓	✓	=				
	3	✓	✓	✓	✓	=				
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	5	✓	✓	✓	✓	=				
	6	✓	✓	✓	✓	=				
	7	✓	✓	✓	✓	=				
	8	✓	✓	✓	✓	=				
	9	✓	✓	✓	✓	=				
	10	✓	✓	✓	✓	=				
	11	✓	✓	✓	✓	=				
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	34	✓	✓	✓	✓	=				
	35	✓	✓	✓	✓	=				
	36	✓	✓	✓	✓	=				

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11274999	REYNOLDS, J. KURTH
	Examiner	Art Unit
	Kevin M Nguyen	2629

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/15/2009	07/10/2009	12/18/2009	06/24/2010	08/26/2010				
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	65			✓	✓	=				
	66				✓	=				
	67				✓	=				
	68				✓	=				

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	J. Kurth REYNOLDS	Confirmation No.: 7508
Appl. No.	:	11/274,999	
Filed	:	November 15, 2005	
Art Unit	:	2629	
Examiner	:	Kevin M. Nguyen	
Docket No.	:	028.0013	
Title	:	METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES	

REQUEST FOR RECONSIDERATION
FILED UNDER 37 C.F.R. § 1.116

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

In response to the Final Office Action mailed July 13, 2010, please consider the remarks that follow under 37 C.F.R. § 1.116.

Amendments to the Claims begin on page 2 of this paper.

Remarks begin on page 12 of this paper.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

69819 7590 09/03/2010

INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/274,999	11/15/2005	J. Kurth Reynolds	028.0013	7508

TITLE OF INVENTION: METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	12/03/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, KEVIN M	2629	345-173000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list Ingrassia Fisher & Lorenz, P.C.

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____ 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: SYNAPTICS INCORPORATED

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Santa Clara, CA

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☒ Issue Fee

☒ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above**)

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 502091 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /S. JARED PITTS/ Date December 2, 2010

Typed or printed name S. Jared Pitts Registration No. 38579

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal

Application Number:	11274999
Filing Date:	15-Nov-2005
Title of Invention:	METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Filer:	S. Jared Pitts/Missy Burbank
Attorney Docket Number:	028.0013

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1510	1510
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1810**

Electronic Acknowledgement Receipt

EFS ID:	8953997
Application Number:	11274999
International Application Number:	
Confirmation Number:	7508
Title of Invention:	METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Customer Number:	69819
Filer:	S. Jared Pitts/Missy Burbank
Filer Authorized By:	S. Jared Pitts
Attorney Docket Number:	028.0013
Receipt Date:	02-DEC-2010
Filing Date:	15-NOV-2005
Time Stamp:	15:31:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1810
RAM confirmation Number	1973
Deposit Account	502091
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

Shenzhen Huiding Tech. Co., Ltd. Exhibit 1013

1	Issue Fee Payment (PTO-85B)	20101202_IssueFee.pdf	122392 727681548d1ba1feb9d48230fd59857d4d426c49	no	1
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	32106 b7b3575840c2a596355ee352a62916aacf03c551	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	154498	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/274,999	01/11/2011	7868874	028.0013	7508

69819 7590 12/22/2010

INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 976 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

J. Kurth Reynolds, Sunnyvale, CA;

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
11/274,999	7868874	2629	9200

OC000000065815779

Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 69819 on 12/17/2013

- **Correspondence Address**
- **Maintenance Fee Address**

The address of record for Customer Number 69819 is:

69819
INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

TO: **Mail Stop 8** **Director of the U.S. Patent & Trademark Office** **P.O. Box 1450** **Alexandria, VA 22313-1450**	**REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK**

In Compliance with 35 § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Northern District of California on the following:

(X) Patents or ( ) Trademarks

DOCKET NO: 15-cv-01742-NC

DATE FILED: April 17, 2015

UNITED STATES DISCTRICT COURT
Robert F. Peckham Federal Building
280 South 1st Street
San Jose, CA 95113

PLAINTIFF: Synaptics Incorporated

DEFENDANT: Goodix Technology Inc. et al.

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1. 7,868,874	Jan. 11, 2011	Synaptics Incorporated
2. 8,338,724	Dec. 25, 2012	Synaptics Incorporated
3. 8,558,811	Oct. 15, 2013	Synaptics Incorporated
4. 8,952,916	Feb. 10, 2015	Synaptics Incorporated
5.		

In the above-entitled case, the following patent(s) have been included.

DATE INCLUDED INCLUDED BY: ( ) Amendment ( ) Answer ( ) Cross Bill ( ) Other Pleading

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1.		
2.		
3.		
4.		
5.		

In the above-entitled case, the following decision has been rendered or judgment issued:

DECISION/JUDGEMENT:

Richard W. Wieking, Clerk

Sandy Morris
(by) Deputy Clerk, Sandy Morris

Copy 1 – Upon initiation of action, mail this copy to Commissioner
Copy 2 – Upon filing document adding patent(s) mail this copy to Commissioner
Copy 3 – Upon termination of action, mail this copy to the Commissioner
Copy 4 – Case file copy

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 11/30/2014. OMB 0651-0051
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	11/274,999
Filing Date	November 15, 2005
First Named Inventor	Joseph Kurth Reynolds
Title	METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES
Art Unit	2629
Examiner Name	Not Yet Assigned
Attorney Docket Number	38018/096001

SIGNATURE of Applicant or Patent Practitioner

Signature	/Robert P. Lord/	Date (Optional)	August 8, 2015
Name	Robert P. Lord	Registration Number	46,479
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of 1 forms are submitted.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-12)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in the attached transmittal letter.

[X] I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent): 111408

OR

[ ] I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

Name	Registration Number	Name	Registration Number

Please recognize or change the correspondence address for the application identified in the attached transmittal letter to:

[X] The address associated with the above-mentioned Customer Number:

OR

[ ] The address associated with Customer Number:

OR

[ ] Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant:

[ ] Inventor or Joint Inventor

[ ] Legal Representative of a Deceased or Legally Incapacitated Inventor

[X] Assignee or Person to Whom the Inventor is Under an Obligation to Assign

[ ] Person Who Otherwise Shows a Sufficient Proprietary Interest (*e.g.*, a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document)

SIGNATURE of Applicant for Patent

Signature	/John T. McFarland/	Date	11/24/2014
Name	John T. McFarland	Telephone	
Title and Company	Senior VP and General Counsel, Synaptics Incorporated		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature, see below *.

[ ] *Total of 1 forms are submitted.

111408
PATENT TRADEMARK OFFICE

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

Docket No.: 38018/096001

IN THE INTERNATIONAL BUREAU OF
THE WORLD INTELLECTUAL PROPERTY ORGANIZATION

International Application No.	:	11/274,999
International Filing Date	:	15 November 2005 (15.11.2005)
Earliest Priority Date	:	N/A
Applicant	:	Synaptics Incorporated
Title	:	METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES

REQUEST FOR RECORDING A CHANGE IN THE INDICATION RELATING TO THE AGENT UNDER RULE 92BIS

The International Bureau of WIPO
PCT Receiving Office Section
34, chemin des Colombettes
1211 Geneva 20
Switzerland

Dear Sirs:

In accordance with Rule 92bis of the PCT Applicant's Guide, Applicants hereby request for recording the following change:

	Change from:	Change to:
Address of Agent	Ingrassia Fisher & Lorenz, P.C. 7010 E. Cochise Road Scottsdale, Arizona 85253	Osha · Liang LLP 909 Fannin Street, Suite 3500 Houston, Texas 77010

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

In the event that any issues are outstanding, please contact the undersigned for prompt resolution.

Dated: 8 August 2015

Respectfully submitted,

By_____/Robert P. Lord/_____

Robert P. Lord
Registration No.: 46,479
OSHA · LIANG LLP
909 Fannin Street, Suite 3500
Houston, Texas 77010
(713) 228-8600
(713) 228-8778 (Fax)

Electronic Acknowledgement Receipt

EFS ID:	23155588
Application Number:	11274999
International Application Number:	
Confirmation Number:	7508
Title of Invention:	METHODS AND SYSTEMS FOR DETECTING A POSITION-BASED ATTRIBUTE OF AN OBJECT USING DIGITAL CODES
First Named Inventor/Applicant Name:	J. Kurth Reynolds
Customer Number:	69819
Filer:	Aly Dossa/Benjamin McLaughlin
Filer Authorized By:	Aly Dossa
Attorney Docket Number:	028.0013
Receipt Date:	08-AUG-2015
Filing Date:	15-NOV-2005
Time Stamp:	11:48:46
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	096001_POA.pdf	366501 994c1e27d4b48a1319d16132476fcd7e1885e693	no	2

Warnings:	
Information:	

Shenzhen Huiding Tech. Co., Ltd. - Exhibit 1013

2	Change of Address	92bis.pdf	19831 1a2fe92dd7b82bdc75015b07962374be2bd03cae	no	2

Warnings:

Information:

Total Files Size (in bytes):	386332

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/274,999	11/15/2005	J. Kurth Reynolds	

CONFIRMATION NO. 7508

POA ACCEPTANCE LETTER

111408
Osha Liang LLP/Synaptics
909 Fannin Street, Suite 3500
Houston, TX 77010

OC000000076790151

Date Mailed: 08/11/2015

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/08/2015.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/dtvernon/

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United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/274,999	11/15/2005	J. Kurth Reynolds	028.0013

CONFIRMATION NO. 7508

POWER OF ATTORNEY NOTICE

69819
INGRASSIA FISHER & LORENZ, P.C. (SYNA)
7010 E. Cochise Road
SCOTTSDALE, AZ 85253

OC00000076790081

Date Mailed: 08/11/2015

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 08/08/2015.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/dtvernon/